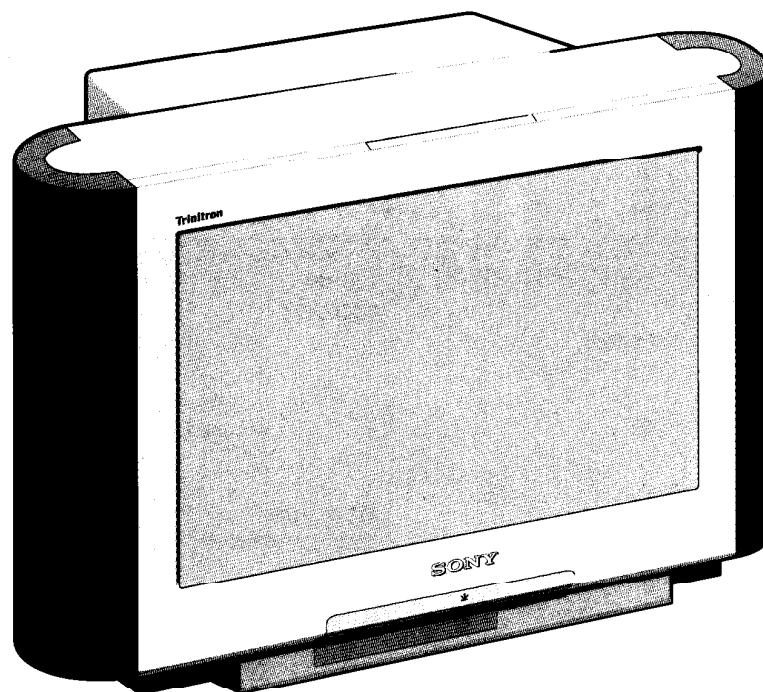


SERVICE MANUAL

AE-5 CHASSIS

MODEL	COMMANDER	DEST	CHASSIS NO.	MODEL	COMMANDER	DEST	CHASSIS NO.
KV-29FC60A	RM-891	Italian	SCC-Q12C-A	KV-29FC60E	RM-891	Spanish	SCC-Q14C-A
KV-29FC60B	RM-891	French	SCC-Q13C-A	KV-29FC60K	RM-891	OIRT	SCC-Q16D-A
KV-29FC60D	RM-891	AEP	SCC-Q11C-A	KV-29FC60R	RM-891	OIRT	SCC-Q16C-A



TRINITRON® COLOR TV
SONY®

ITEM MODEL	Television System	Stereo System	Channel Coverage	Color System
Italian	B/G/H,D/K	GERMAN Stereo	ITALIA VHF : A-H2 (C) UHF : 21-69 PAL B/G/H VHF : E2-E12 UHF : E21-E69 CABLE TV (1) : S1-S41 CABLE TV (2) : S01-S05,M1-M10,U1-U10 DK VHF : R01-R12 UHF : R21-R69	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
French	B/G/H, D/K,L,I	GERMAN/NICAM Stereo	L VHF : F02 F10 UHF : F21 F60 CABLE : B-Q B/G/H VHF : E2-E12 UHF : E21-E69 CABLE TV (1) : S1-S41 CABLE TV (2) : S01-S05, M1-M10, U1-U10 ITALIA VHF : A-H2 (C) UHF : 21-69 I UHF : B21-B69	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
AEP	B/G/H, D/K	GERMAN Stereo	PAL B/G/H/ VHF : E2-E12 : E21-E69 CABLE TV (1) : S1-S41 CABLE TV (2) : S01-S05, M1-M10, U1-U10 ITALIA VHF : A-H2 (C) UHF : 21-69 D/K VHF : R01-R12 UHF : R21-R69	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
Spanish	B/G/H, D/K	GERMAN/NICAM Stereo	PAL B/G/H/ VHF : E2-E12 : E21-E69 CABLE TV (1) : S1-S41 CABLE TV (2) : S01-S05, M1-M10, U1-U10 ITALIA VHF : A-H2 (C) UHF : 21-69	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
OIRT	B/G/H, DK	KV-29FC60K GERMAN/NICAM Stereo KV-29FC60R GERMAN Stereo	B/G/H VHF : E2-E12 UHF : E21-E69 CABLE TV (1) : S1-S41 D/K VHF : R01-R12 UHF : R21-R69	PAL NTSC4.43, NTSC3.58 (VIDEO IN)

MODEL	29FC60A	29FC60B	29FC60D	29FC60E	29FC60K	29FC60R
Power Consumption	130W	130W	130W	130W	130W	130W

[PICTURE TUBE] Super Trinitron
Approx. 72 cm (29 inches)
(Approx. 68 cm picture measured diagonally)
110 degree deflection

[FRONT]
Video output - phono jack
Audio inputs - phono jacks
S Video input - 4 pin DIN
Headphone jack : stereo minijack

Input/Output Terminals

[REAR]

- ➡ 1 / ➡ 2 21-pin Euro connector (CENELEC standard).
 - Inputs for Audio and Video signals.
 - Inputs for RGB.
 - Outputs of TV Video and Audio signals.
 - ➡ 2 / ➡ 3 21-pin Euro connector
 - Inputs for Audio and Video signals.
 - Inputs for S video.
 - Outputs for Video and Audio signals (selectable).
 - ➡ 3 / ➡ 4 21-pin Euro connector
 - Inputs for Audio and Video signals.
 - Inputs for S video.
- External speaker terminals : 2-pin DIN (5)

Sound output 2x25W (Music Power)
Power requirements 220 - 240V
Dimensions Approx 800x581x496mm
Weight Approx 53 kg
Supplied accessories RM-891 Remote Commander (1)
IEC designated R6 battery (2)
Other features NICAM*, FASTEXT, TOPTEXT
* (KV-29FC60B/29FC60E/29FC60K only)

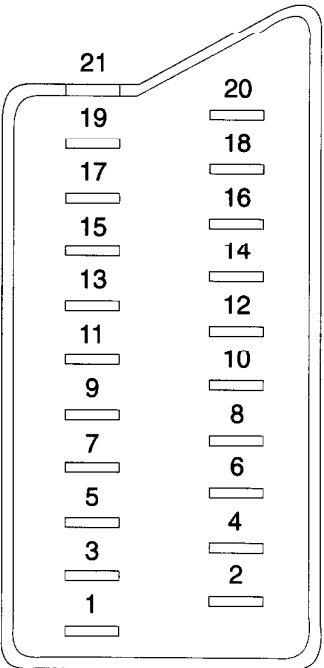
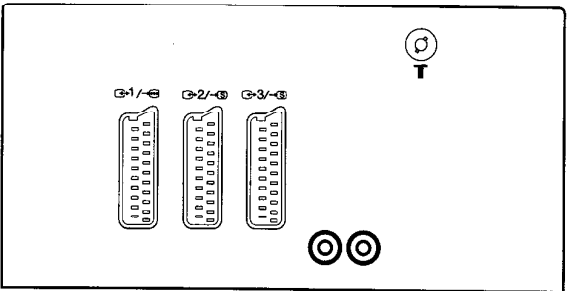
[RM-891]

Remote control system Infrared control
Power requirements 3V dc
2 batteries IEC designation
R6 (size AA)
Dimensions Approx 56x210x24mm (w/h/d)
Weight Approx 110g (Not including battery)

Design and specifications are subject to change without notice.

Model Name Item	KV-29FC60A	KV-29FC60B	KV-29FC60D	KV-29FC60E	KV-29FC60K	KV-29FC60R
Pal Comb	OFF	OFF	OFF	OFF	OFF	OFF
PIP	ON	ON	ON	ON	ON	ON
RGB Priority	ON	ON	ON	ON	ON	ON
Woofer Box	OFF	OFF	OFF	OFF	OFF	OFF
Scart 1	ON	ON	ON	ON	ON	ON
Scart 2	ON	ON	ON	ON	ON	ON
Front in (3)	ON	ON	ON	ON	ON	ON
Scart 4	ON	ON	ON	ON	ON	ON
Projector	OFF	OFF	OFF	OFF	OFF	OFF
AKB in 16:9 mode	ON	ON	ON	ON	ON	ON
Norm B/G	ON	ON	ON	ON	ON	ON
Norm I	OFF	ON	OFF	OFF	OFF	OFF
Norm D/K	ON	ON	ON	ON	ON	ON
Norm AUS	OFF	OFF	OFF	OFF	OFF	OFF
Norm L	OFF	ON	OFF	OFF	OFF	OFF
Norm SAT	OFF	OFF	OFF	OFF	OFF	OFF
Norm M	OFF	OFF	OFF	OFF	OFF	OFF
Teletext	ON	ON	ON	ON	ON	ON
Nicam Stereo	OFF	ON	OFF	ON	ON	OFF
Language Preset	Italian	French	German	Spanish	OIRT	OIRT

21 pin connector



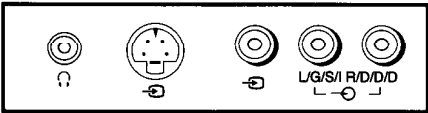
Pin No	1	2	4	Signal	Signal level
1	○	○	○	Audio output B (right)	Standard level : 0.5V rms Output impedance : Less than 1kohm*
2	○	○	○	Audio output B (right)	Standard level : 0.5V rms Output impedance : More than 10kohm*
3	○	○	○	Audio output A (left)	Standard level : 0.5V rms Output impedance : Less than 1kohm*
4	○	○	○	Ground (audio)	
5	○	○	○	Ground (blue)	
6	○	○	○	Audio input A (left)	Standard level : 0.5V rms Output impedance : More than 10kohm*
7	○	●	●	Blue input	0.7 +/- 3dB, 75 ohms positive
8	○	○	○	Function select (AV control)	High state (9.5-12V) : Part mode Low state (0-2V) : TV mode Input impedance : More than 10K ohms Input capacitance : Less than 2nF
9	○	○	○	Ground (green)	
10	○	○	○	Open	
11	○	●	●	Green	Green signal : 0.7 +/- 3dB, 75 ohms, positive
12	○	○	○	Open	
13	○	○	○	Ground (red)	
14	○	○	○	Ground (blanking)	
15	○	-	-	Red input	0.7 +/- 3dB, 75 ohms, positive
16	○	●	●	Blanking input (Ys signal)	High state (1-3V) Low state (0-0.4V) Input impedance : 75 ohms
17	○	○	○	Ground (video output)	
18	○	○	○	Ground (video input)	
19	○	○	○	Video output	1V +/- 3dB, 75ohms, positive sync 0.3V (-3+10dB)
20	○	-	-	Video input	1V +/- 3dB, 75ohms, positive sync 0.3V (-3+10dB)
21	○	○	○	Common ground (plug, shield)	

○ Connected



Not Connected (open) * at 20Hz - 20kHz

Pin No.	Signal	Signal Level
1	Ground	
2	Ground	
3	Y (S signal) input	1V ± 3dB 75 ohm, positive Sync. 0.3V -3 + 10dB
4	C (S signal) input	0.3V ± 3dB 75 ohm, positive Sync.



AE-5 SELF DIAGNOSTIC SOFTWARE

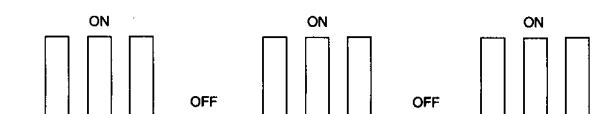
The identification of errors within the AE-5 chassis is triggered in one of two ways :- 1: Busy or 2: Device failure to respond to IIC. In the event of one of these situations arising the software will first try to release the bus if busy (Failure to do so will report with continuous flashing LED) and then communicate with each device in turn to establish if a device is faulty. If a device is found to be faulty the relevant device number will be displayed through the LED (Series of flashes which must be counted) See table 1., non fatal errors are reported using this method.

Diagnostic Item Description	No of times Standby LED Flashes	Probable cause Location	Detected Symptoms
Power does not turn on	Does not light	Power cord is not plugged in Fuse is burned out	Power does not come on No power is supplied to the TV AC power supply is faulty
+B Overcurrent (OCP)	2 times	H.OUT (Q6803/6804) is shorted. (D Board) Linearity FET (Q6806) is shorted. (D Board) IC6604 Power IC is shorted. (D Board)	Power does not come on Load on power line has shorted
Vertical Deflection stopped	4 times	+15V is not supplied R6835 open (D Board) -15V is not supplied R6834 open (D Board) IC6700 is shorted (D Board)	Vertical deflection pulse has stopped Power line has shorted

ERROR	LED ERROR COUNT
No error	00
Not allowed (may be confused with Sircs response flash!)	01
Over Current Protection	02
Over Voltage Protection	03
Vertical Protection	04
AKB	05
H - Protection	06
Speaker Protection	07
General IIC Line 0 error	08
MEGATEXT	09
NVM	10
Main colour decoder	11
Feature Box	12
D/A converter	13
Backend	14
Multi sound processor	15
Auto Wide	16
External RAM	17

Flash Timing Example : e.g. error number 3

StBy LED



ERROR DETECTION MONITOR

Device acknowledge is used to check IIC errors. Device acknowledge is checked by sending an IIC start sequence during CRT power on. Each device is checked three times, if there is no acknowledge after every attempt, it will be regarded as an error. There are three steps to check errors

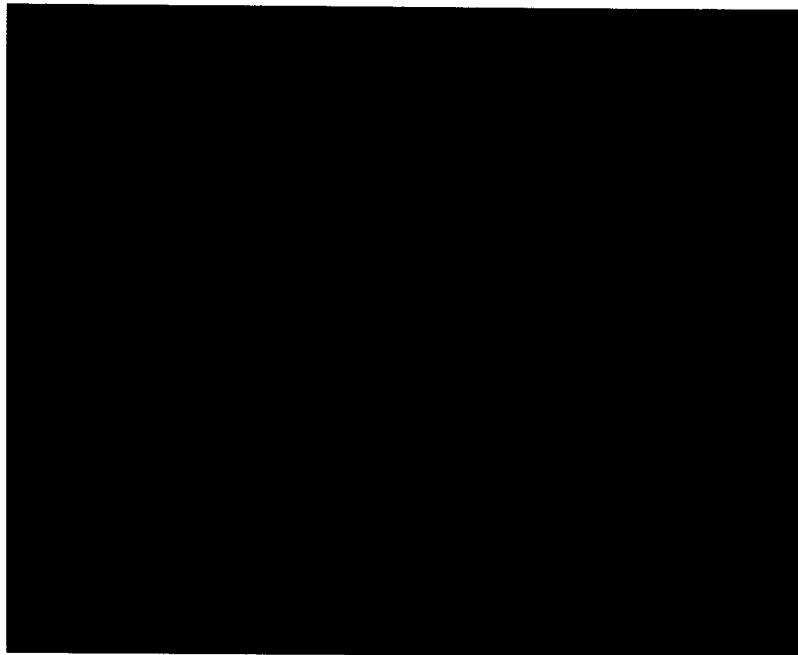
1. IIC line 0
If all devices except the NVM are errors, IIC line 0 error is displayed
2. Board check
If all devices mounted on one board have errors, board error is displayed
3. Each device check
If IIC line error and board error are not detected then the device with an error is displayed

The detected errors can be displayed as follows:

1. Error Monitor Menu
2. Error Reader

1. ERROR MONITOR MENU

The error monitor menu is displayed by selecting TT33. The following menu will be displayed:



2. ERROR READER DISPLAY

The error reader display is connected to the service connector to read actual error codes. The part number for the error reader display is S-188-900-10. Once an error has been detected it will then be displayed on the two digit error reader. The errors displayed refer to the following table :

Send Data to Error Reader				
Error Code	Data high	Data Low	Error type	Function
00 00h	-	f0h	no device	
Gen.IIC Error				
00 01h	f0h	01h	IIC 0 line	
00 02h	f0h	02h	IIC 1 line	not used
Board Error				
01 00h	f1h	00h	A Board	
02 00h	f2h	00h	B1 Board	
03 00h	f3h	00h	D2 Board	
04 00h	f4h	00h	BP Board	
05 00h	f5h	00h	D1 Board	
06 00h	f6h	00h	E Board	
07 00h	f7h	00h	J Board	
Device Error				
A Board				
01 01h	f1h	01h	CXA1875	Port Expander
01 02h	f1h	02h	TU1326	Main Tuner
01 03h	f1h	03h	TU1350	Sub Tuner
B1 Board				
02 01h	f2h	01h	P83C654	Feature Box
02 02h	f2h	02h	SDA9280	D/A Converter
B2 Board				
03 01h	f3h	01h	SAA4977	Basic
03 02h	f3h	02h	SAA4950	Memory
BP Board				
04 01h	f4h	01h	CXD2069	MID
D1 Board				
05 01h	f5h	01h	CXA8070	Dynamic Conv.
05 02h	f5h	02h	CXA1875	Port Expander
E Board				
06 01h	f6h	01h	CXD2100	Backend
J Board				
07 01h	f7h	01h	CXD2057	Auto Wide
07 02h	f7h	02h	SDA9288	PIP
07 03h	f7h	03h	TDA9320	Sub Colour
07 04h	f7h	04h	TDA9320	Main Colour
07 05h	f7h	05h	CXA1875	Sub Sound
07 06h	f7h	06h	TDA7309	HP Amp
07 07h	f7h	07h	TEA6422DT	Audio SW
07 08h	f7h	08h	MSP3410D	Sound Proc
07 09h	f7h	09h	TC9337F	Sound DSP

TABLE OF CONTENTS

Section	Title	Page	Section	Title	Page
	Self-Diagnostic Function	.....5	5. DIAGRAMS		
1. GENERAL			5-1.	Block Diagram (1)	.....35
Overview	.....9			Block Diagram (2)	.....39
First time operation	.....10			Block Diagram (3)	.....43
Advanced Operations	.....11			Block Diagram (4)	.....48
Teletext	.....16		5-2.	Circuit Board Location	.....53
2. DISASSEMBLY			5-3.	Schematic Diagrams and	
2-1.	Speaker Grille Removal	.....17		Printed Wiring Boards	.....53
2-2.	Rear Cover Removal	.....17	*	C Board	.....55
2-3.	Chassis Assy Removal	.....17	*	J Board	.....63
2-4.	Service Position	.....17	*	U Board	.....73
2-5.	U Board Removal	.....18	*	A Board	.....79
2-6.	J Board Removal	.....18	*	B2 Board	.....83
2-7.	J Shield Removal	.....18	*	VM Board	.....88
2-8.	B2 Board Removal	.....18	*	D1 Board	.....93
2-9.	Picture Tube Removal	.....19	*	M Board	.....97
	Removal and Replacement of the		*	E Board	.....101
	Main-Bracket bottom plates	.....20	*	D Board	.....109
3. SET-UP ADJUSTMENTS			*	F1 Board	.....113
3-1.	Beam Landing	.....21	*	F Board	.....114
3-2.	Convergence	.....22	*	H1 Board	.....116
3-3.	Focus	.....24	5-4.	Semiconductors	.....117
3-4.	Screen [G2] White Balance	.....24	5-5.	IC Blocks	.....120
4. CIRCUIT ADJUSTMENTS			6. EXPLODED VIEWS		
4-1.	Electrical Adjustments	.....26	6-1.	Chassis	.....121
4-2.	Volume Electrical Adjustments	.....32	6-2.	Picture Tube	.....122
4-3.	Test Mode 2	.....33	7. ELECTRICAL PARTS LIST		.....123

CAUTION

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR THE CARBON PAINTED ON THE CRT, AFTER REMOVAL OF THE ANODE CAP

WARNING !!

AN ISOLATING TRANSFORMER SHOULD BE USED DURING ANY SERVICE WORK TO AVOID POSSIBLE SHOCK HAZARD DUE TO LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE POWER LINE.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARKED **Δ** ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL FOR SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION

APRES AVOIR DECONNECTE LE CAP DE L'ANODE, COURT-CIRCUITER L'ANODE DU TUBE CATHODIQUE ET CELUI DE L'ANODE DU CAP AU CHASSIS METALLIQUE DE L'APPAREIL, OU AU COUCHE DE CARBONE PEINTE SUR LE TUBE CATHODIQUE OU AU BLINDAGE DU TUBE CATHODIQUE.

ATTENTION !!

AFIN D'EVITER TOUT RISQUE D'ELECTROCUTION PROVENANT D'UN CHÂSSIS SOUS TENTION, UN TRANSFORMATEUR D'ISOLEMENT DOIT ETRE UTILISÉ LORS DE TOUT DÉPANNAGE. LE CHÂSSIS DE CE RÉCEPTEUR EST DIRECTEMENT RACCORDÉ À L'ALIMENTATION SECTEUR.

ATTENTION AUX COMPOSANTS RELATIFS À LA SÉCURITÉ !!

LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET PAR UNE MARQUE **Δ** SUR LES SCHÉMAS DE PRINCIPE, LES VUES EXPLOSÉES ET LES LISTES DE PIÈCES SONT D'UNE IMPORTANCE CRITIQUE POUR LA SÉCURITÉ DU FONCTIONNEMENT, NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMÉRO DE PIÈCE EST INDIQUÉ DANS LE PRÉSENT MANUEL OU DANS DES SUPPLÉMENTS PUBLIÉS PAR SONY.

Overview

- 1** This section briefly describes the buttons and controls on the TV set and the Remote Control. Open the flaps at the front and back of this Instruction Manual for detailed illustrations. For more information refer to the page numbers given in the overview.

Remote Control

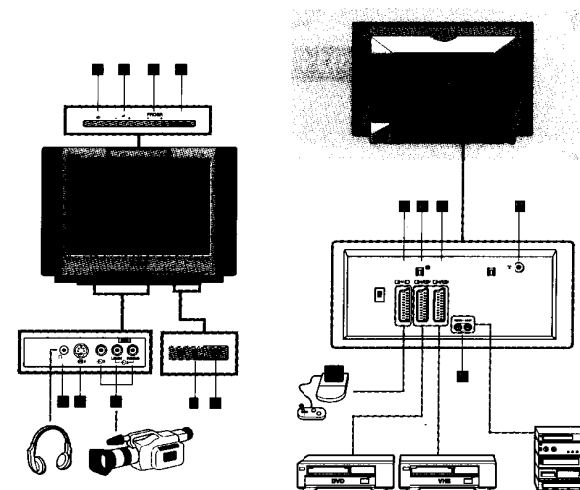
Symbol	Description	See page
1 TVI/⏻	TV: standby mode on/off	32
2 [ON]	TV: on-screen display	32
3 [Teletext]	Teletext: index page	42
4 [Source]	Selecting of input source	44
5 [Freeze]	Teletext: Freezing a subpage	42
6 [PIP]	PIP: Swapping the screens	41
7 [PIP]	PIP: Selecting the source	41
8 [PIP]	PIP: Switching on and off	41
9 1, 2, ..., 9, 0	Number buttons	32
10 [Back]	Back to the channel last selected	32
11 [Format]	Selecting of screen format	32
12 [No func]	No function on this set	
13 [Joystick]	Joystick for menu selection	31
	Press OK to confirm	
14 MENU	Switching on and off of Meru system	31
15 [PROGR +/-]	TV: Channel selection up- and downwards	32
16 [Teletext]	Teletext: Page selection up-and downwards	42
17 [Volume]	Volume control	32
18 [Picture]	Picture mode	32
19 [Equaliser]	Equaliser mode	32
20 [Channel]	Selection of double digit channel numbers	32
21 [Freeze]	Freezing of TV picture	32
22 [No func]	No function on this set	
23 [Teletext]	Teletext: Switching on	42
24 [TV]	TV: Selecting of TV mode	32
25 [Teletext]	Teletext: Switching off	42
26 [Mute]	Muting of sound on/off	32
27 VIDEOI/⏻	VCR: Standby mode	45
Buttons under cover		
28 [Clock]	Displaying of the time	32
29 [CH +/-]	VCR operation	45
30 [VTR 1 2 3 4 MDP]	Video equipment selector	
31 [VCR]	Buttons for VCR operation	
32 [Reset]	Resetting of picture setting	32

SECTION 1 GENERAL

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual.

TV-set – front and top

Symbol	Description	See page
A [Headphone]	Headphone jack	46
B [S-video]	S-video input jack	44
C [Phono]	Phono video/audio inputs	44
D [Standby]	Indicator for Standby mode	32
E [Power]	Power switch	32
F [Source]	Selecting of input source	44
G [Volume]	Volume control	32
H [PROGR +/-]	Channel selection up- and downwards	32
I [CONTROL]	Control panel: Switching on/off	32




TV-set – rear

Symbol	Description	See page
J [Scart 1]	21-pin Euro connector (Scart)	44
K [Scart 2]	21-pin Euro connector (Scart)	44
L [Scart 3]	21-pin Euro connector (Scart)	44
M [Aerial]	Aerial socket	30
N [Audio]	Audio phono jacks	46

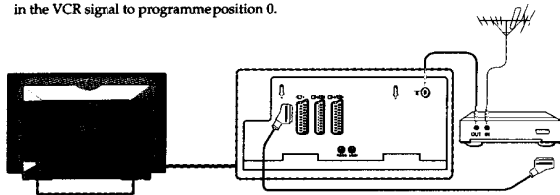
i The following chapter contains all the steps necessary when first installing your TV and the basic TV functions.

Step 1 Installation

A Connecting the TV Set

- 1 Connect the TV set to the mains socket (220-240 V.AC, 50 Hz).
- 2a Connect a conventional aerial cable to the socket marked **TV**  on the rear of the TV set.
- or
- 2b Connect your Satellite Receiver to one of the Scart connectors **1** **2** **3** of the TV set.

i When connecting a VCR to your TV set:
We recommend that you use the preset function Manual Programme Preset (page 33) to tune in the VCR signal to programme position 0.



B Inserting the Batteries into the Remote Control

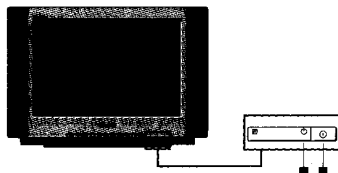
- i** Make sure to insert the batteries using the correct polarities.
Dispose of exhausted batteries according to your local regulations.



C Switching on the TV Set

- Press the switch  **E** at the front of the TV set.









i If the standby mode indicator  **D** on the TV is lit, press TV I/⏻  on the Remote Control to switch on the TV set.

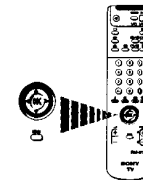


Step 2 Basic Presetting

















A The Menu System

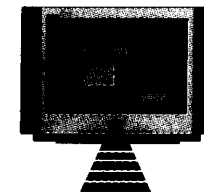
i Your TV uses an on-screen menu system to guide you through the operations.
Use the following buttons on the Remote Control to operate the menu system:

- Press MENU  to switch the menu on and off.
- Use , , ,  of the joystick  to select within the menu system.
- Press OK  to store.
- When menu is switched off:
Press  to return to the last menu screen.








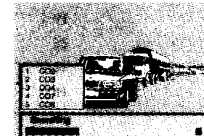
B Selecting Language and Country

- 1 Press the MENU  button.
-  The menu Language/Country appears on the screen.
- 2 Push the joystick  to  Push the joystick  to  to select the language.
Press OK .
-  The menus appear in the selected language.
- 3 Push the joystick  to  to select Country. Push the joystick  to .
- 4 Select the country in which you will operate the TV set using  or .
- i** Select Off if you wish an automatic tuning without ACI (fast presetting with a given channel sequence)
 - Confirm by pressing OK .
-  The menu Auto Tuning appears.



C Automatic Tuning In of Channels

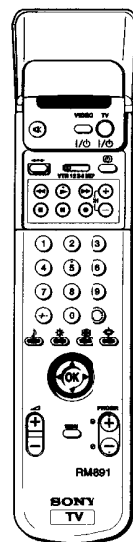
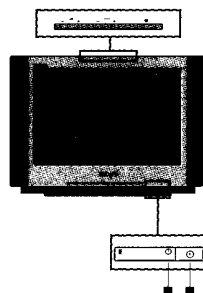
- Push the joystick  to  for more than 2 sec..
-  After all available channels are stored, the TV goes back to the programme position with which you started the automatic tuning. Your TV is now ready for use.
- To stop the automatic tuning: Press OK .
- If you wish to change the sequence of the stored channels, go to Sorting Programme Positions in Advanced Presetting.
- If you need to change or repeat the tuning afterwards (e.g. when you move house): select the menu Auto Tuning in the Set Up  menu.



Step 3 Basic TV operation

i This section explains the most important functions for the daily use of your TV set. When using the control panel on the top of the TV set, first press **CONTROL**, then **F**, **G** or **H**.

Function	Operation
Switching on/off	<ul style="list-style-type: none"> Press ⏻ on the TV set. To save energy, we recommend to switch off the TV completely when set is not in use.
Switching off temporarily (Standby mode)	<ul style="list-style-type: none"> Press TV I/O. TV is now in standby mode. Indicator ⏻ lights up. After: 15 min. without any TV signal and no pressing of a button, the TV automatically goes into standby mode.
Switch on from standby mode	<ul style="list-style-type: none"> Press TV I/O, PROGR +/- or any number button.
Selecting channels	<ul style="list-style-type: none"> Press PROGR +/- or the number buttons. For a double digit number first press -/+, then the two number buttons.
Using the Channel overview	<ul style="list-style-type: none"> Press OK. Push to ▼ or ▲ to select a channel, push to ► to confirm.
Going to the channel last selected	<ul style="list-style-type: none"> Press ◀.
Adjusting the volume	<ul style="list-style-type: none"> Press ▲ + or ▼.
Muting the sound	<ul style="list-style-type: none"> Press MUTE to switch sound off or on.
Selecting Equaliser mode (See also page 39)	<ul style="list-style-type: none"> Press EQ repeatedly to select one of the following modes: Personal, Vocal, Jazz, Rock Pop or Flat.
Selecting Picture mode (see also page 38)	<ul style="list-style-type: none"> Press PICT repeatedly to select one of the following modes: Personal, Movie or Live.
Freezing the picture	<ul style="list-style-type: none"> Press FREEZE if you wish to make a note of an information, e.g., a telephone number. Press again to return to the normal TV screen.
Changing the screen format	<ul style="list-style-type: none"> Press ASPECT repeatedly to select 4:3 or 16:9 (imitation of wide screen format).
Resetting picture/sound settings to factory levels	<ul style="list-style-type: none"> Open the cover of the Remote Control. Press RESET.
Displaying on-screen indications	<ul style="list-style-type: none"> Press ON/STBY to switch indications on or off.
Displaying the time (only when teletext is broadcast)	<ul style="list-style-type: none"> Open the cover of the Remote Control. Press TIME to switch time on or off.
Using Teletext (see also page 42)	<ul style="list-style-type: none"> Press TEXT to switch on. Press TEXT to switch off. Select a page using the number buttons. E.g. for page 125 press 1, 2 and 5. Select the index page by pressing INDEX.
Viewing the input signal of a connected device (see also page 44)	<ul style="list-style-type: none"> Press INPUT repeatedly to select the desired input source. Press ◀ to return to the TV picture.



Advanced Presetting

Sorting of Programme Positions

- i** After having used Automatic Tuning of channels you may wish to rearrange the order of the channels
- Press **MENU**. Select the symbol **≡** using **▼**. Push to **►**.
 - Select Programme Sorting using **▼**. Push to **►** to enter.
 - Select the programme position of the channel you wish to sort using **▲** or **▼**. Push to **►** to enter.
 - Move the channel to the new programme position using **▲** or **▼**. Store by pressing **OK**.
 - The channel is now at the new position. The other programme positions move accordingly.
 - To sort other programme positions repeat steps 3 to 4.
 - Press **MENU** to return to the normal TV screen.

Manual Tuning In of Channels

- i** Use this function to preset channels or a video input source one by one to programme positions of your choice.
- Press **MENU**. Select the symbol **≡** using **▼**. Push to **►**.
 - Select Installation using **▼**. Push to **►** to enter. Select Manual Programme Preset using **▼**. Push to **►** to enter.
 - Select the programme position by pushing to **▲** or **▼**. Push twice to **►**. The column **SYS** is highlighted.
 - Select the TV system using **▲** or **▼**. Push to **►** to enter. Available TV systems are B/G for western European countries, D/K for eastern European countries, EXT for a video input source (please go to step 5c after selecting EXT).
 - The column **CH** is highlighted.
 - Select your method for the channel tuning using **▲** or **▼**. Push to **►** to enter.

i You have the choice between C for a terrestrial channel, S for a cable channel, F for direct frequency input.

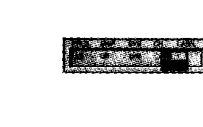
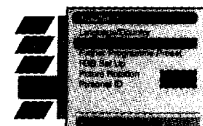
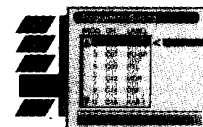
 - Direct Channel Input - S, C or F**

i For channel numbers input a two digit number, for the channel frequency a three digit number.

 - Select the two or three digits by using the number buttons 0 to 9.
 - To start the search and to store the channel, press **OK**.
 - To preset other channels repeat steps 3 to 5a.
 - Channel search (SEARCH)**

i Use Search if you do not know the channel number or frequency


 - Start the search for the next available channel by pushing to **▼**.
 - Store the channel by pressing **OK** or continue the search by pushing again to **▼**.
 - To search for other channels repeat steps 3 to 5b.
 - For video input sources (EXT)**
 - Select the Video Input source using **▲** or **▼**.
 - Store your selection by pressing **OK**.
 - To allocate other sources repeat steps 3 to 5c.
 - Press **MENU** to return to the normal TV screen.

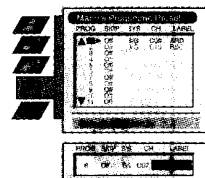


Advanced Presetting

Captioning a Station Name


i During presetting the channels are usually labelled automatically. You can, however, individually name a channel or a video input source.

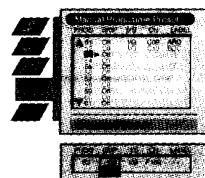
- 1 Press MENU. Select the symbol  using ▼. Push to ►.
- 2 Select Installation using ▼. Push to ► to enter. Select Manual Programme Preset using ▼. Push to ► to enter.
- 3 Select the programme position of the channel or the video source you wish to label by pushing to ▼ or ▲. Push repeatedly to ► until the first element of the position LABEL is highlighted.
- 4 Select a number, a letter, + or a blank using ▲ or ▼. Push to ► to confirm. Select the other four characters in the same way.
- 5 Store your selection by pressing OK.
- 6 To label other channels or video sources repeat steps 3 to 5.
- 7 Press MENU to return to the normal TV screen.



Skipping of Programme Positions


i In case of 100 programme positions there may be unused positions, which you can skip in the menu Manual Programme Preset. When changing channels with the PROG +/- buttons they do then not appear. You can, however, still select them using the number buttons.

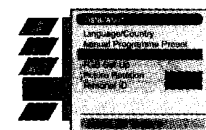
- 1 Press MENU. Select the symbol  using ▼. Push to ►.
- 2 Select Installation using ▼. Push to ► to enter. Select Manual Programme Preset using ▼. Push to ► to enter.
- 3 Select the programme position you wish to skip by pushing to ▲ or ▼. Push to ► to enter.
- 4** The column SKIP is highlighted.
- 4 Select ON using ▼.
- 5 Store by pressing OK.
- 6 To skip other programme positions repeat steps 3 to 5.
- 7 Press MENU to return to the normal TV screen.



Advanced Presetting

Using of Further Programme Preset

















- i** Using the menu Further Programme Preset you can
- a) individually adjust the volume level of each channel.
 - b) improve the quality of a weak channel (picture or sound distortions) with manual fine tuning.
 - c) preset the AV output for programme positions of those channels with scrambled signals (e.g. from a Pay TV decoder). In this way a connected VCR records the unscrambled signal.
- 1 Press MENU. Select the symbol  using ▼. Push to ►.
 - 2 Select Installation using ▼. Push to ► to enter. Select Further Programme Preset using ▼. Push to ► to enter.
 - 3 Select the programme position of the desired channel by pushing to ▲ or ▼. Push repeatedly to ► to select:
VOL (Volume Offset), AFT (Automatic Fine Tuning) or DECODER.
 - 4** The selected item changes colour.
 - 4a **VOL**
Push to ▲ or ▼ to adjust the volume level (range -7 to +7) of the channel. Store by pressing OK.
Repeat steps 3 and 4a if you wish to adjust the volume level of other channels.
 - b **AFT**
Push to ▲ or ▼ to fine tune the channel (range -15 to +15). Store by pressing OK. Repeat steps 3 and 4b if you wish to fine tune other channels.
 - c **DECODER**
Push to ▲ or ▼ to select AV1 (Euro AV socket 1) or AV2 (Euro AV socket 2) as output for the video source on this programme position. Store by pressing OK. Repeat steps 3 and 4c if you wish to preset the AV output of other video sources.
 - i** Should you use Auto Tuning afterwards, this setting will be cancelled.
 - 5 Press MENU to return to the normal TV screen.

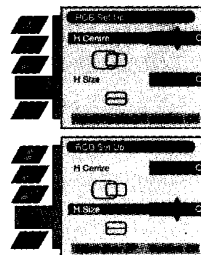


Advanced Presetting

Adjusting the Picture Geometry for an RGB Source










i When connecting an RGB source such as a Sony playstation you may need to readjust the picture geometry.

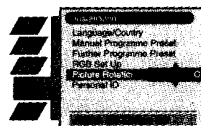
- 1 Select the connected RGB source  by pressing  repeatedly.
- 2 Press MENU. Select the symbol  using . Push to .
- 3 Select Installation using . Push to  to enter. Select RGB Set Up using . Push to  to enter.
- 4 Select H Centre by pushing to . Adjust the centre of the picture (range from -10 to +10) using  or . Store by pressing OK.
- 5 Select H Size using . Push to  to enter. Adjust the horizontal coordinates (range from -10 to +10) using  or . Store by pressing OK.
- 6 Press MENU to return to the normal TV screen.



Adjusting the Picture Rotation

i Because of the earth magnetism the picture might slant. In this case you can readjust the picture.











- 1 Press MENU. Select the symbol  using . Push to .
- 2 Select Installation using . Push to  to enter. Select Picture Rotation using . Push to  to enter.
- 3 Adjust the Picture Rotation (adjusting range -5 to +5) by pushing to  or . Store by pressing OK.
- 4 Press MENU to return to the normal TV picture.



Advanced Presetting














Inputting Your Personal ID



i You can programme your TV with a safety code, so that you can be traced if your TV is stolen and recovered. This code can only be input once! Make sure to write it down in this Instruction Manual.





- 1 Press MENU. Select the symbol  using . Push to .
- 2 Select Installation using . Push to  to enter. Select Personal ID using . Push to  to enter.
- 3a Select the first of a total of 11 characters (letter, number, + or a blank) by using  or .
- b Push to  to go to the next character.
- c Repeat a and b for all characters.
- 4 Store by pressing OK.
- 5 Press MENU to return to the normal TV screen.



Presetting and Labelling of Input Sources

- 1 Press MENU. Select the symbol  using . Push to .
- 2 Select AV Preset using . Push to  to enter.
- 3 Select the desired AV input (AV 1, 2 or 3) using  or . Push to  to enter.
- i** After each step you have the choice between memorizing (press OK) or going to the next item (push to ).
- 4 **To label the source:**
 - a Push to  to select Label.
 - b Select the first character using  or . Push to  to confirm.
 - c Repeat step b to select the other 4 characters.
 - d Store by pressing OK.
- 5 Repeat steps 3 to 4 for the other AV inputs.
- 6 **Selecting the AV3 Input Source:**

i In case of AV3 you have the choice between the front AV3 sockets  or the rear Scart 3  connector.

 - a Push to  to select AV3 Input. Push to  to enter.
 - b Select Front or Rear using  or .
 - c Store by pressing OK.
- 7 Press MENU to return to the normal TV screen.




Advanced TV operation

Adjusting Picture and Sound

i Picture and sound are adjusted at the factory. You can, however, adjust them individually.

- 1 Press MENU.
Select the symbol  for Picture or  for Sound using ▲ or ▼.
Push to ► to enter.

 The menu Picture or Sound Control is displayed.

- 2 Select the desired item using ▲ or ▼. Push to ► to enter.
- 3 Adjust the selected item using ▲, ▼, ► and ◀. Press OK to store.

i Refer to the tables on this and the following page for more information.

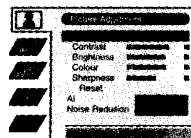
- 4 Repeat steps 2 and 3 to adjust other items.
- 5 Press MENU to return to the normal TV screen.

Picture Control

Item	Effect/Operation
Picture Mode	▼ Personal (for individual settings) Movie (for movie broadcasts) ▲ Live (for live broadcasts)
Contrast	Less ◀ ▶ More
Brightness*	Darker ◀ ▶ Brighter
Colour*	Less ◀ ▶ More
Hue**	Reddish ◀ ▶ Greenish
Sharpness*	Softer ◀ ▶ Sharper
Reset	Resets picture to the factory preset levels
AI (Artificial Intelligence)	▼ Off: normal ▲ On: Automatic optimization of contrast level according to the TV signal
Noise Reduction	▼ Off: Normal ▲ On: Reduces picture noise in case of a weak broadcasting signal

* Only if Personal is selected in Picture Mode

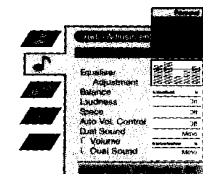
** Only available for NTSC colour signal (e.g. US video tapes)



Advanced TV operation


Sound Control

Item	Effect/Operation
Equaliser Mode	Select between the following sound settings ▼ Personal Vocal Jazz Rock Pop ▲ Flat (fixed setting, cannot be adjusted)
Equaliser adjustment	i You can adjust the mode selected in Equaliser mode by cutting and boosting of 5 selected frequency bands. i Only the changes made in Personal can be stored, the others return to factory setting. ● Select the desired bar using ► or ◀, adjust using ▲ and ▼. Press OK to store.
Balance	▲ More left ▼ More right
Loudness	▲ Off: Normal ▼ On: For music broadcasts
Space	▲ Off: Normal ▼ On: Special acoustic effect
Auto Volume Control	▼ On: volume level of the channels will stay the same independent of the broadcast signal (e.g. in case of advertisements) ▲ Off: volume level changes according to the broadcast signal
Dual Sound	● For a bilingual broadcast: A for channel 1 ◀ ▶ B for channel 2 ● For a stereo broadcast: Stereo ◀ ▶ Mono
Headphones	Less ◀ ▶ More
Volume	● For a bilingual broadcast: A for channel 1 ◀ ▶ B for channel 2
Dual Sound	● For a stereo broadcast: Stereo ◀ ▶ Mono ● PIP i When PIP is switched on, you can additionally select the PIP sound for the headphones






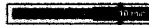
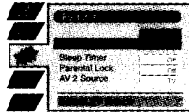
Advanced TV operation

Using the Features Menu

- 1 Press MENU. Select the symbol  using \blacktriangledown . Push to \blacktriangleright .
- 2 Select the desired menu item using \blacktriangledown . Push to \blacktriangleright to enter.
- 3 Select the desired setting using \blacktriangle or \blacktriangledown .
- 4 Store by pressing OK.
- 5 Press MENU to return to the normal TV screen.


Features

Item	Effect/Operation
PIP Position	 See next page for details
Sleep Timer	 You can select a time period after which the TV switches itself into standby mode <ul style="list-style-type: none"> \blacktriangle Off 10 min. 20 min. ... \blacktriangledown 90 min.
Parental Lock	<ul style="list-style-type: none"> \blacktriangledown Off: Normal mode \blacktriangle On: TV can only be switched on out of standby-mode using the Remote Commander, the buttons on the TV do not work.
AV2Source	 You can select the source to be output from the Scart connector $\text{C}2/\text{C}2$. In this way you can record from this socket while watching another source. <ul style="list-style-type: none"> \blacktriangle TV audio/video signal from the aerial T AV1 audio/video signal from Scart 1 AV2 audio/video signal from Scart 2 \blacktriangledown AV3 audio/video signal from front or rear connectors







Advanced TV operation





Using Picture-in-Picture

-  Picture-in-Picture (PIP) lets you display a second, small screen within the main TV picture. In this way you can watch the video output from any connected equipment, e.g., from a VCR, while watching TV.



Switching PIP on and off

- Press C/C .
-  The small screen is displayed.
-  The source of the small screen is the one last used when the TV was on.
- Press C/C  again to switch PIP off.

Selecting a PIP source

- 1 Press \uparrow .
 -  The symbol \uparrow is displayed in the bottom left-hand corner of the screen.
 - 2 Press C/C  repeatedly until the desired source appears.
-  You can select between TV, AV1, AV2, AV3.
- If no video source (e.g. VCR or Camera) is connected, the PIP will be noisy.
 - You cannot display an RG3 source in the PIP.


Swapping the screens


- Press C/C .
-  The two screens are swapped.

Changing channels if the TV picture is in the PIP

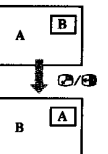
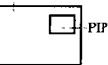
- First press \uparrow , then the respective number buttons.

Changing the PIP position

-  There are four different positions of the small screen within the main screen. Select the PIP position in the Features menu.

- 1 Press MENU. Select the symbol  using \blacktriangledown . Push to \blacktriangleright to enter.
- 2 Select PIP position by pushing to \blacktriangleright .
- 3 Select the desired position using \blacktriangledown or \blacktriangle . Press OK to select.
- 4 Press MENU to return to the normal TV screen.

Main screen



Teletext

Most TV channels broadcast information via teletext. The index page of the teletext service (usually page 100) gives you information on how to use their service.

- Make sure to use a TV channel with a strong signal, otherwise there may be Teletext errors.

Direct Access Functions

Switching Teletext on and off

- Select the TV channel which carries the teletext service you want to view.
- Press once to switch teletext on.
 - The teletext menu is displayed.
 - Press twice for Mix mode.
 - The TV broadcast and the Teletext display are overlapped.
- Press or press a third time to switch teletext off.

Selecting a Teletext Page

Direct Page Selection

- Input the three digits of the page number using the number buttons .

If you have made a mistake:

- Type in any three digits, then reenter the correct page number.

Page Catching

- Select a teletext page which has several page numbers on it (e.g., the index page).
- Press OK .
 - Page Catching is displayed.
- Select the desired page number using or and press OK.
- The requested page is displayed after some seconds.



Selecting the next or the preceding page

- Press (Page +) or (Page -).

Selecting the index page

- Press .

Selecting a subpage

- A teletext page may consist out of several subpages. In this case an information line is displayed showing the number of the subpages.
 - Select the mode by pushing to . Select the subpage by using or .



Freezing a Teletext subpage

- Press or .
 - The symbol is displayed and the subpage is not updated.
- Press to resume normal teletext reception.

Using Fastext*

*depending on availability of service

- Fastext lets you access pages with one button stroke. When Fastext is broadcast, a colour-coded menu appears at the bottom of the screen. The colours of this menu correspond to the red, green, yellow and blue buttons , , , on the Remote Control.
 - Press the coloured button which corresponds to the colour in the colour-coded menu.



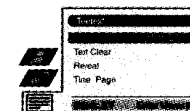
Teletext

Using the Teletext Menu

- This TV set has a menu-guided teletext system. When teletext is switched on you can use the joystick buttons to operate the teletext menu.

Select the menu functions as follows:

- Press MENU .
- The Teletext menu is superimposed on the teletext display.
- Select the teletext function using or . Push to to enter.



Top/Bottom/Full

- For convenient reading of a Teletext page you can enlarge it. After having selected the function, a sub menu Top Bottom Full OK is displayed.

- Push to to enlarge the upper half of the screen, push to to enlarge the lower half. Press OK to resume the normal size. Press to resume the normal Teletext operation.



Text Clear

- After having selected the function, you can watch a TV channel while waiting for a requested Teletext page. As soon as the page is available, the symbol changes colour.

- Press to view the page.



Reveal

- Some teletext pages contain hidden information (e.g., for a quiz), which you can reveal.

After having selected the function, the hidden information appears.

- Press to resume the normal Teletext operation.

Time Page*

*depending on availability of service

- You can call up a time-coded page - such as an alarm page - at a time specified by you.

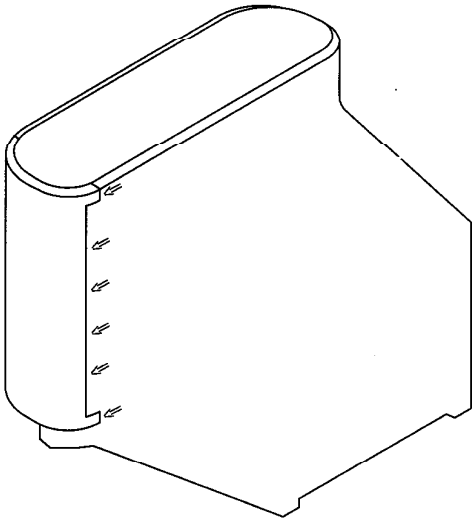
After having selected the function a sub menu is displayed.


- Select On using or . Push to to enter.
- Enter the three digits of the desired page using the number buttons .
- Enter the four digits of the desired time using the number buttons .
- Press OK to store.
- The time is displayed in the top left-hand corner of the screen. At the requested time the page is displayed.



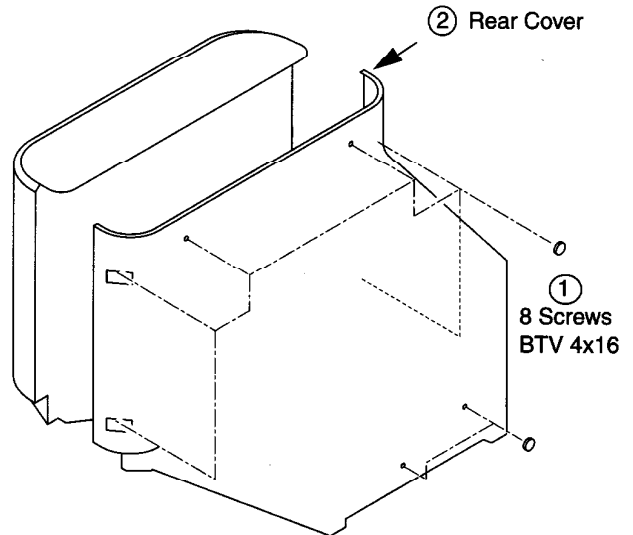
SECTION 2 DISASSEMBLY

2-1. SPEAKER GRILLE REMOVAL



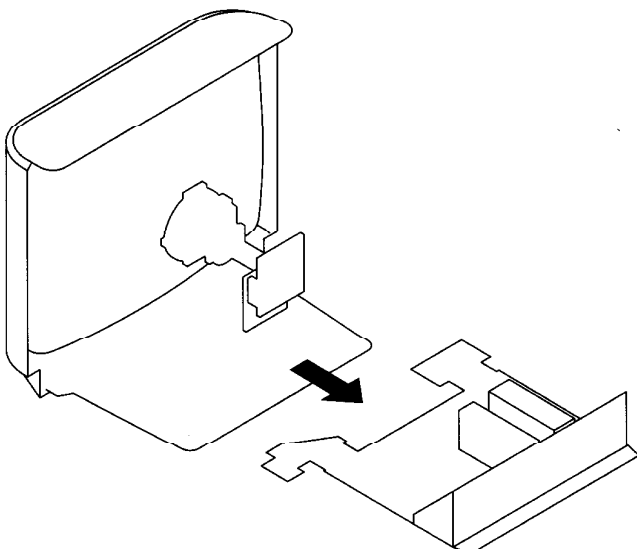
Remove the speaker grille by pressing the buttons marked . While pressing the top button press the remaining five buttons in turn to release the grille.

2-2. REAR COVER REMOVAL

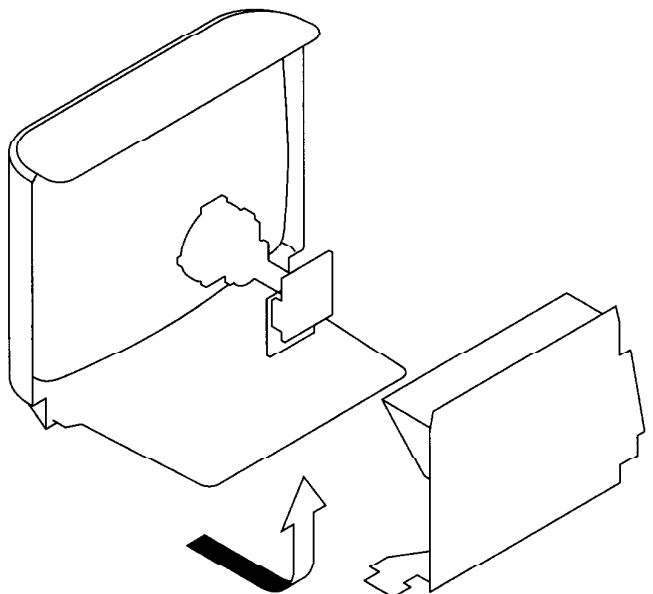


CAUTION:
Take care not to damage the C Board when removing or refitting the rear cover.

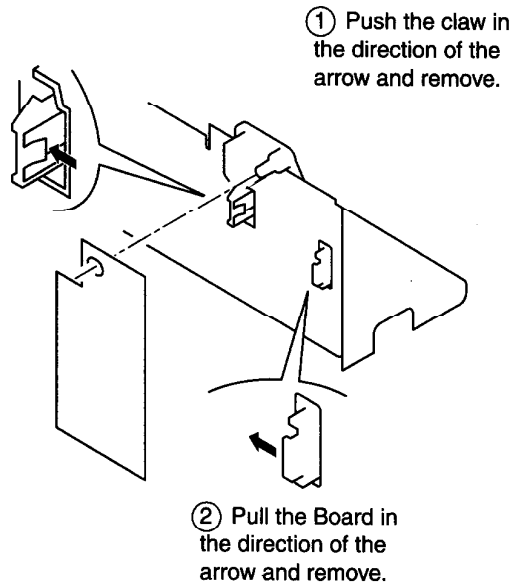
2-3. CHASSIS ASSY REMOVAL



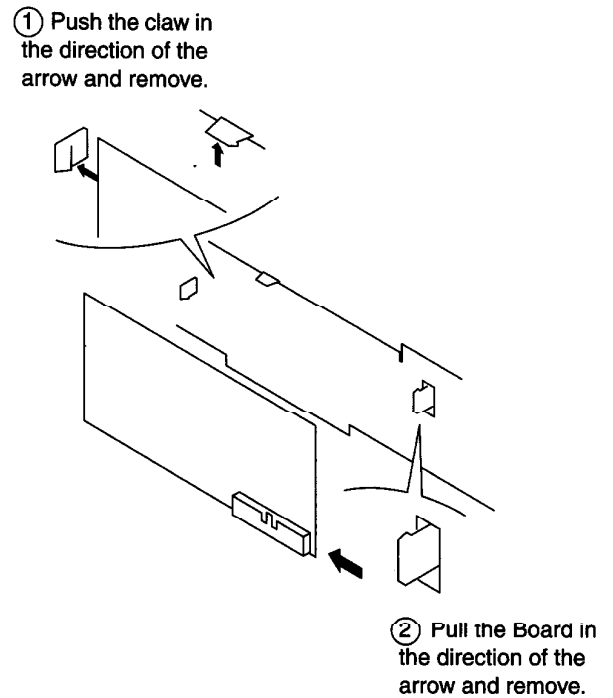
2-4. SERVICE POSITION



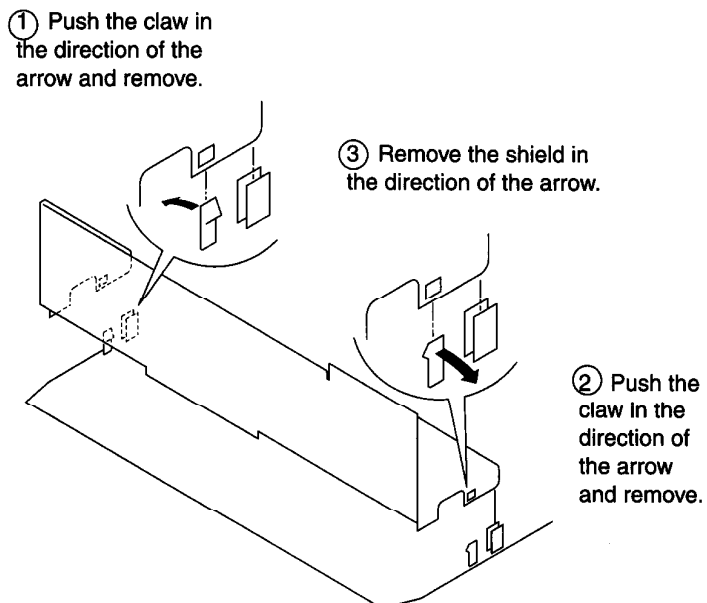
2-5. U BOARD REMOVAL



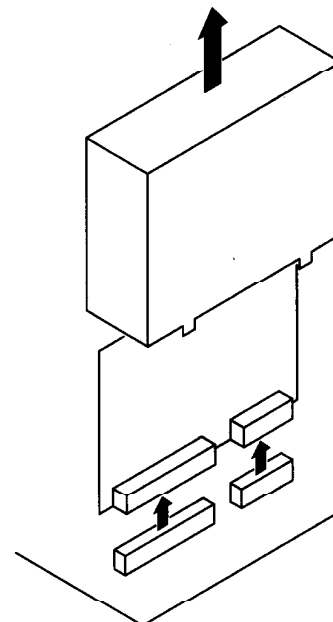
2-6. J BOARD REMOVAL



2-7. J SHIELD REMOVAL



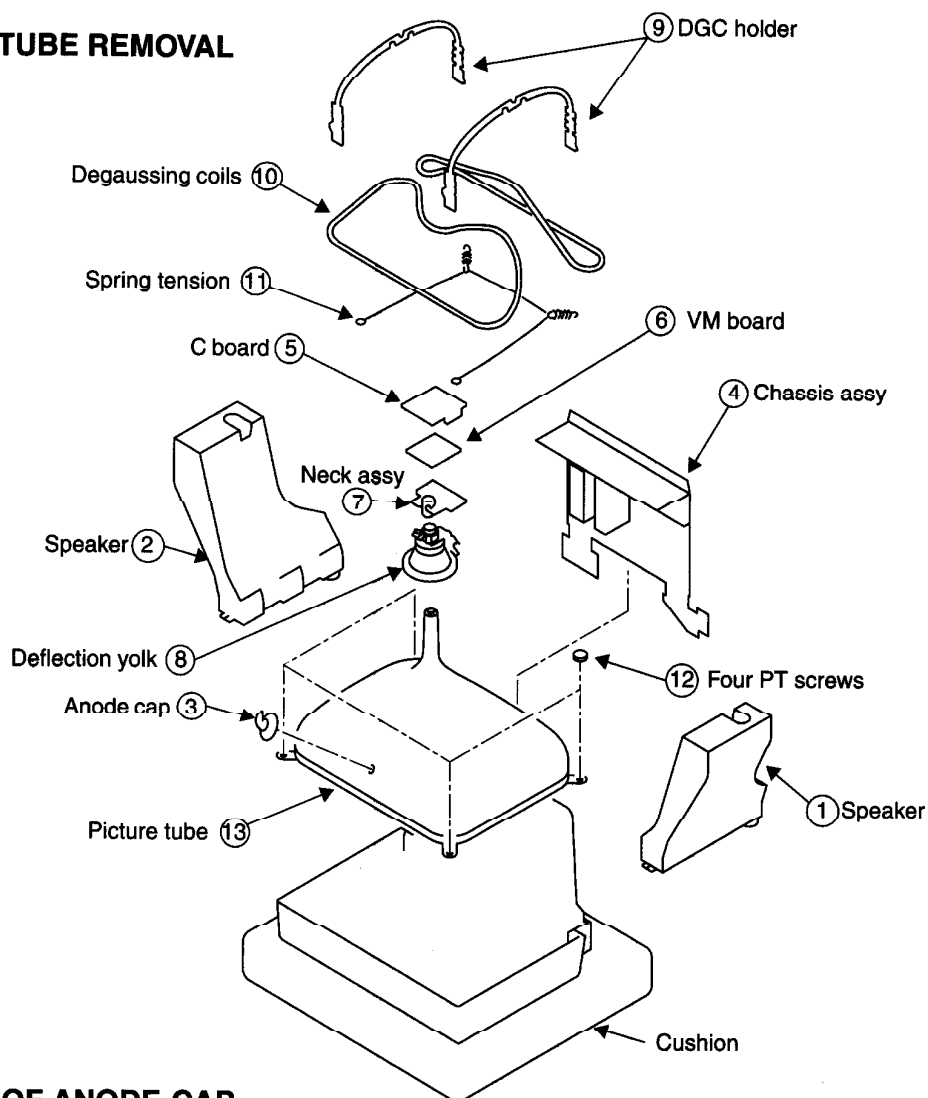
2-8. B2 BOARD REMOVAL



NOTE

All other boards are removed in a similar manner to those shown

2-9. PICTURE TUBE REMOVAL



• REMOVAL OF ANODE-CAP

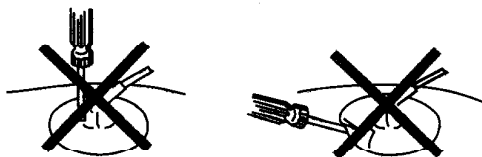
Note : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon paint on the CRT, after removing the anode.

* REMOVING PROCEDURES.

-
- ① Turn up one side of the rubber cap in the direction indicated by the arrow (a)
 - ② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow (b)
 - ③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling it up in the direction of the arrow (c)

• HOW TO HANDLE THE ANODE-CAP

- ① To prevent damaging the surface of the anode-cap do not use sharp materials.
- ② Do not apply too great a pressure on the rubber, as this may cause damage to the anode connector.
- ③ A metal fitting called a shatter hook terminal is fitted inside the rubber cap. Do not turn the rubber foot over excessively this may cause damage if the shatter hook sticks out.



REMOVAL AND REPLACEMENT OF THE MAIN-BRACKET BOTTOM PLATES.

(1) REMOVING THE PLATES

In the event of servicing being required to the solder side of the D Board printed wiring board, the bottom plates fitted to the main chassis bracket require to be removed.

This is performed by cutting the gates with a sharp wire cutter at the locations indicated by arrows.

Note : There are 4 plates fitted to the main bracket and secured by 4 gates.

Only remove the necessary plate to gain access to the printed wiring board.



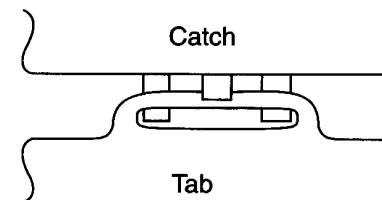
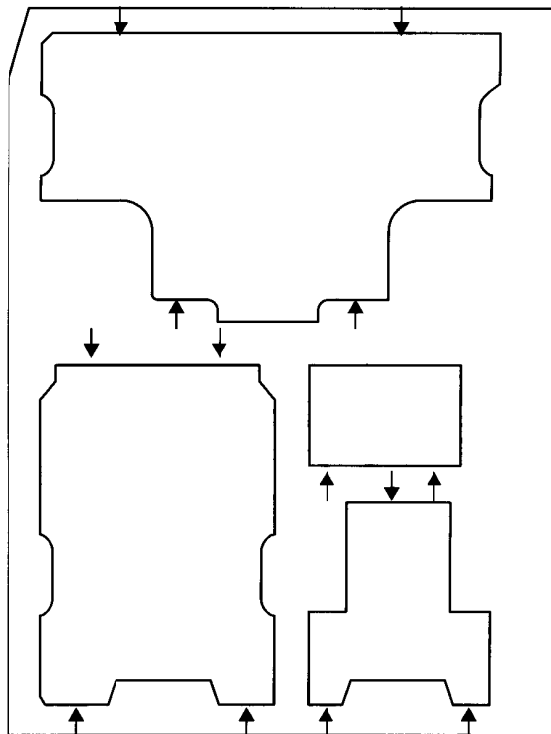
For safety reasons, on no account should the plates be removed and not refitted after servicing.

(2) REFITTING THE PLATES

Because the plates differ in size it is important that the correct plates are refitted in their original location.

Please note that the plates need to be rotated 180 degrees from the cut position to allow the tabs to be fitted in the catch positions.

20



SECTION 3 SET-UP ADJUSTMENTS

- When complete readjustment is necessary or a new picture tube is installed, carry out the following adjustments.
- Unless there are specific instructions to the contrary, carry out these adjustments with the rated power supply.
- Unless there are specific instructions to the contrary, set the controls and switches to the following settings:

Contrast normal

Brightness normal

Carry out the following adjustments in this order:

- 3-1. Beam Landing
- 3-2. Convergence
- 3-3. Focus
- 3-4. White balance

Note: Test equipment required

1. Color bar/pattern generator.
2. Degausser.
3. Digital multimeter.
4. Oscilloscope.

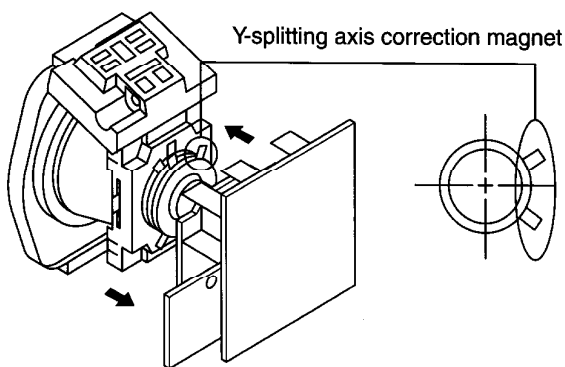
3-1. BEAM LANDING

Preparation:

1. In order to reduce the influence of geomagnetism on the set's picture tube, face it in an easterly or westerly direction.
2. Switch on the set's power and degauss with the degausser.

(1) Adjustment of Correction Magnet for Y-Splitting Axis

1. Input a crosshatch signal from the pattern generator.
2. Set the Picture control to minimum and confirm that the Brightness control is set to normal.
3. Position the neck assembly as indicated in Fig.3-2.
4. Move the deflection yolk as far forward as is possible.
5. Adjust the upper and lower pin symmetrically by opening or closing the Y-splitting axis correction magnets located on the neck assembly.
6. Return the deflection yolk to its original position.



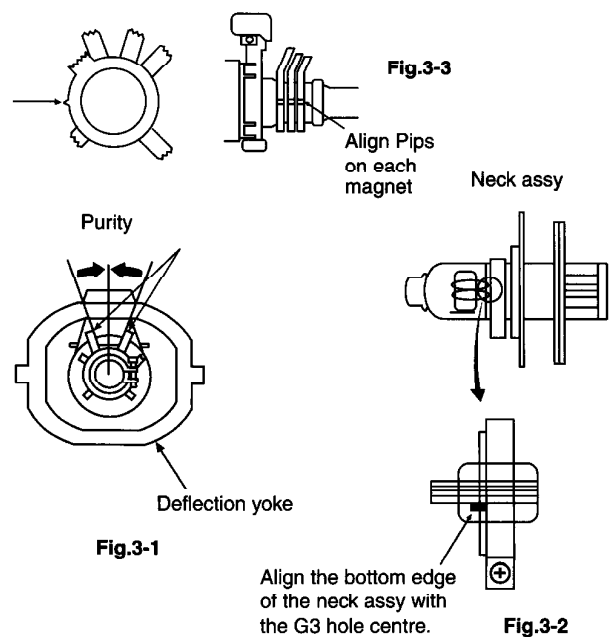
Caution :

High voltages are present on the Deflection yolk terminals - take care when handling the Deflection yolk whilst carrying out adjustments.

(2) Landing

Note : Before carrying out the following adjustments adjust the magnets as indicated below [See Fig.3-3].

1. Input an all-white signal from the pattern generator. Maximize the picture setting and adjust the Brightness setting.
2. Rough-adjust the focus and horizontal convergence.
3. Loosen the deflection yolk screws and align the purity adjustment knob to its central position. [See Fig.3-1].
4. Switch from the all-white pattern to an all-green pattern.
5. Move the deflection yolk backwards and adjust with the purity magnet so that the green is at the centre and it aligns symmetrically. [See Fig.3-4].
6. Move the deflection yolk forward and adjust so that the entire screen becomes green.
7. Switch the raster signal to red, then to blue and verify the landing condition.
8. When the position of the deflection yolk has been determined, fasten the deflection yolk with the screw.
9. If the beam does not land correctly in all the corners of the screen, use magnets to correct it. [See Fig.3 5].



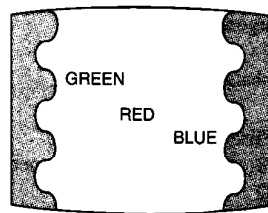


Fig. 3-4

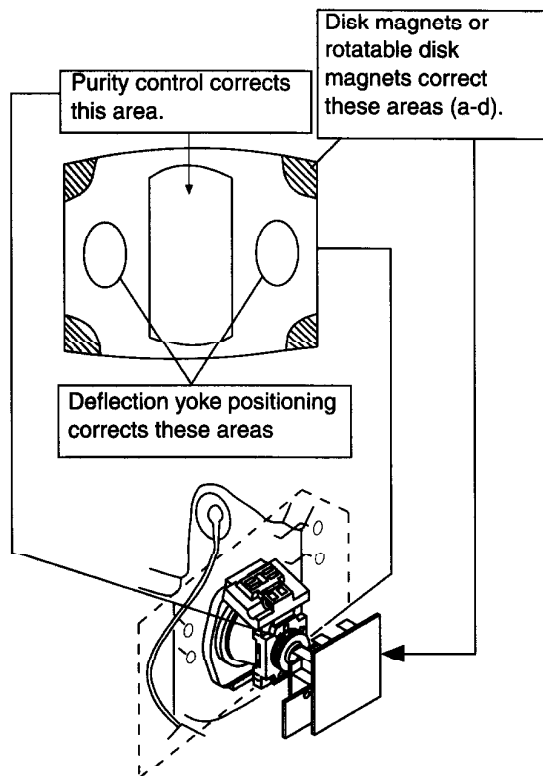
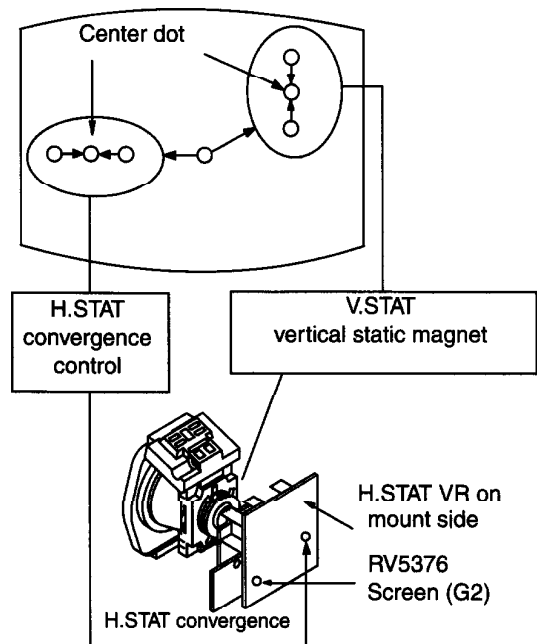


Fig. 3-5

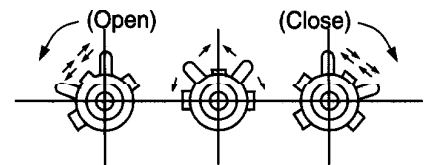
3-2. CONVERGENCE

(1) Screen centre convergence [Static convergence]

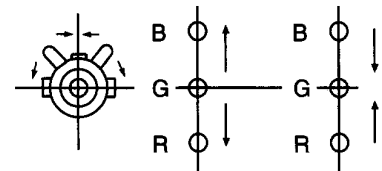
1. Input a dot signal from the pattern generator.
Normalize the picture setting.
2. [Moving horizontally], adjust the H.STAT control so that the horizontal red, green and blue dots coincide at the centre of the screen.
3. [Moving vertically], adjust the V.STAT magnet so that the vertical red, green and blue dots coincide at the centre of the screen.



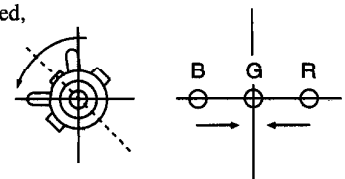
- If the horizontal dots are unable to coincide with the variable range of the H.STAT convergence, adjust together with the V.STAT convergence while tracking.
[Adjust the convergence by tilting the V.STAT convergence or by opening and closing the V.STAT convergence.]



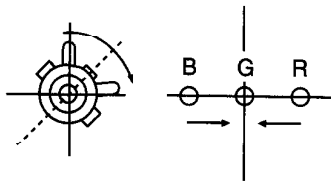
4. Movement of the red, green and blue dots by tilting the V.STAT magnet and by opening or closing the V.STAT magnet.
- a). By opening or closing the V.STAT magnet, the red, green and blue dots move as indicated below.



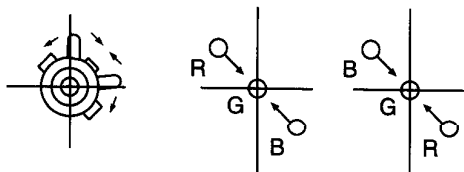
- b). By rotating the V.STAT magnet counter clockwise, the red, green and blue dots move as indicated below.



- c). By rotating the V.STAT magnet clockwise, the red, green and blue dots move in the direction indicated below.



- d). By opening or closing the V.STAT magnet, the red, green and blue dots move in the direction indicated below.

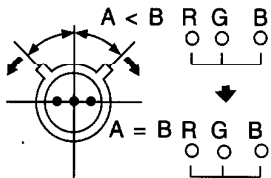


Note : If the blue dot does not coincide with the red and green points correct the points by using the BMC [Hexapole] magnet.

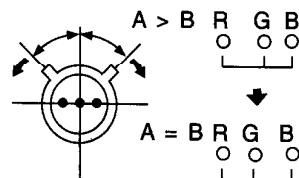
5. Correction for HMC [horizontal mis-convergence] and VMC [vertical mis-convergence] by using the BMC [Hexapole] magnet.

- a). HMC correction by BMC [Hexapole] magnet and movement of the electron beam.

HMC correction(A)

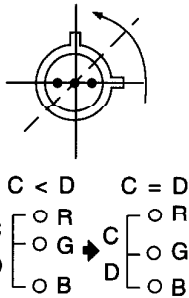


HMC correction(B)

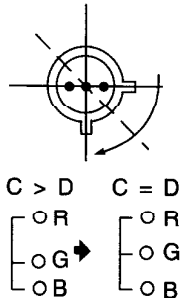


- b). VMC correction by BMC [Hexapole] magnet and movement of the electron beam.

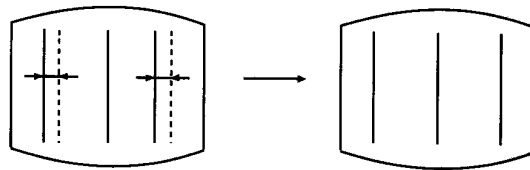
VMC correction(A)



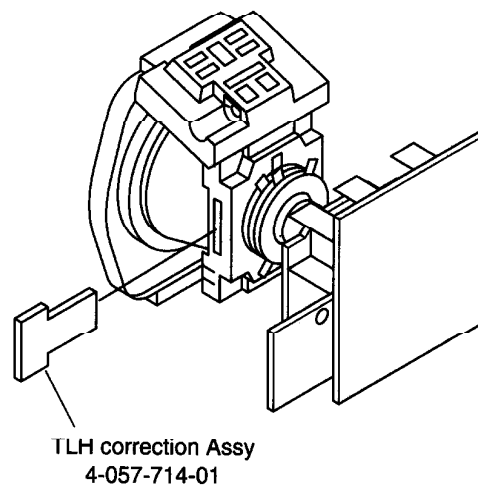
VMC correction(B)



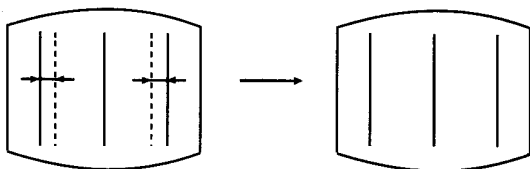
HAMP



7. HTIL correction can be performed by adding a THL correction ASSY to the DY.



HTIL



Layout of each control

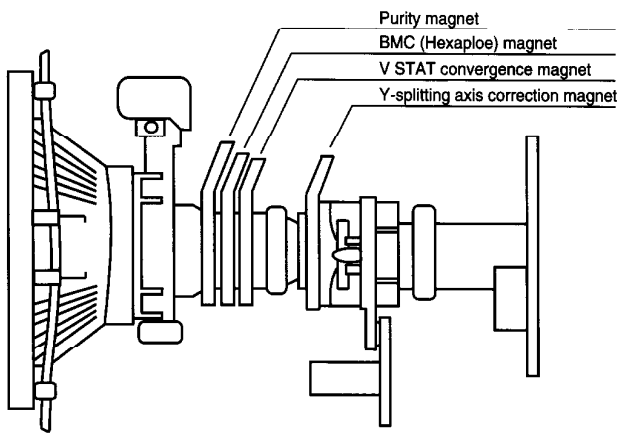
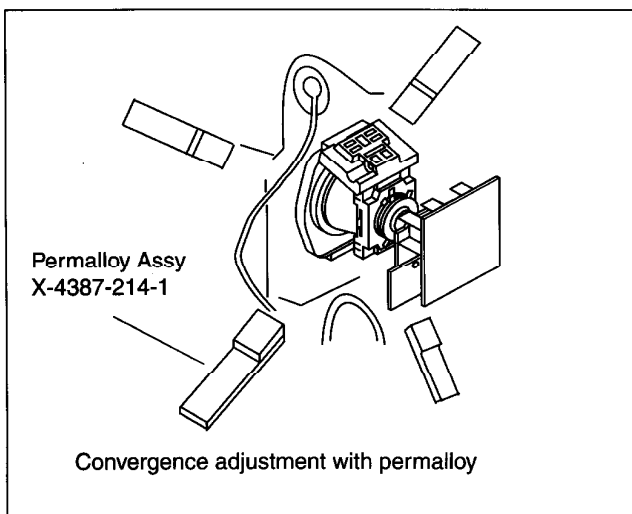
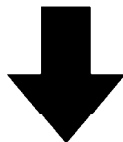
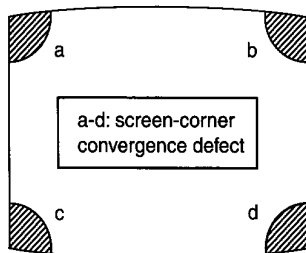


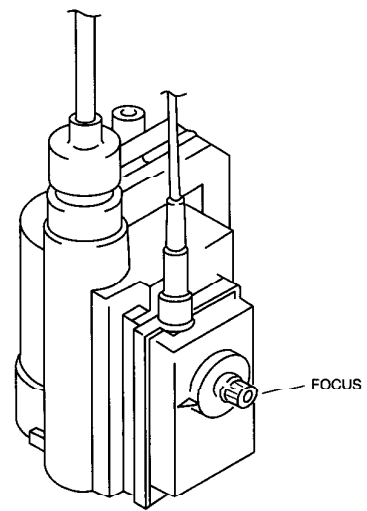
Fig 3-5

Note : If you are unable to adjust the corner convergence properly, this can be corrected with the use of permalloys.



3-3. FOCUS

1. Receive a television broadcast signal.
2. Normalize the picture setting.
3. Adjust the focus control located on the flyback transformer to obtain the best focus at the centre of the screen.
Bring only the centre area of the screen into focus, the magenta-ring appears on the screen. In this case, adjust the focus to optimize the screen uniformly.



3-4. SCREEN (G2), WHITE BALANCE

[Adjustment in the service mode using the remote commander]

G2 adjustment (RV5376)

1. Input a dot signal from the pattern generator.
2. Set the Picture, Brightness and Colour to minimum.
3. Apply 175V DC from an external power supply to the R, G and B cathodes of the CRT.
4. Whilst watching the picture, adjust the G2 control RV5376 [SCREEN] located on the C Board to the point just before the flyback return lines disappear.

White balance adjustment for TV mode

1. Input an all-white signal.
2. Enter into the Service Mode by pressing 'TEST', 'TEST' and 'MENU' 'MENU' on the Service Commander.
3. Select 'Backend' from the on screen menu display and press 'OK'.
4. The 'Backend' menu will appear on the screen.
5. Set the contrast to MAX.
6. Set the 'R DRIVE' to 41.
7. Adjust the 'G DRIVE' and 'B DRIVE' so that the white balance becomes optimum.
8. Press the 'OK' button to write the data for each item.
9. Set the contrast to MIN.
10. Set the 'R CUT-OFF' to 31.
11. Adjust the 'G CUT-OFF', and 'B CUT-OFF' with the left and right buttons on the remote commander so that the white balance becomes optimum.
12. Press the 'OK' button to write the data for each item.

Backend					
No	Descr.	Def	Min	Max	Data
1	R-on	ON	OFF	ON	ON
2	G-on	ON	OFF	ON	ON
3	B-on	ON	OFF	ON	ON
4	D-col	OFF	OFF	ON	ON
5	Color-axis	2	0	3	2
6	Contrast	63	0	63	63
7	Limit-Luv	3	0	3	3
8	Hue	31	0	63	31
9	Colour	31	0	63	28
10	CTI -Level	2	0	3	2
11	Brightness	31	0	63	31
12	Gamma	2	0	3	2
13	Sharpness	31	0	63	44
14	LTI-Level	0	0	3	0
15	R-Drive	41	0	63	40
16	BLK-Bottom	0	0	3	0
17	G-Drive	41	0	63	38
18	ABL TH	0	0	3	0
19	B-Drive	41	0	63	21
20	ABL-Mode	2	0	3	2
21	Sub Bright	31	0	63	32
22	VM-Level	2	0	3	2
23	R-Cutoff	31	0	63	41
24	Preover	2	0	3	2
25	G-Cutoff	31	0	63	45
26	DPIC-Level	2	0	3	2
27	B-Cutoff	31	0	63	48
28	DC-Tran	1	0	3	1
29	Sub-Cont	7	0	15	7
30	LRGB2-Lvl	12	0	15	12
31	P-Abl	15	0	15	15
32	DL-Pass	OFF	OFF	ON	OFF
33	Sharp.Fo	ON	OFF	ON	ON
34	Aging-W	OFF	OFF	ON	OFF
35	Aging-B	OFF	OFF	ON	OFF
36	CB-offset1	7	0	15	7
37	CR-offset1	7	0	15	7
38	CB-offset2	7	0	15	7
39	CR-offset2	7	0	15	7
40	Sub Colour	0	-8	8	-1

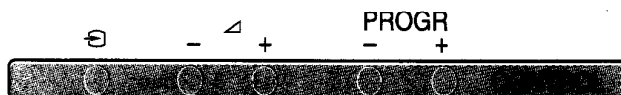
SECTION 4 CIRCUIT ADJUSTMENTS

4-1. ELECTRICAL ADJUSTMENTS

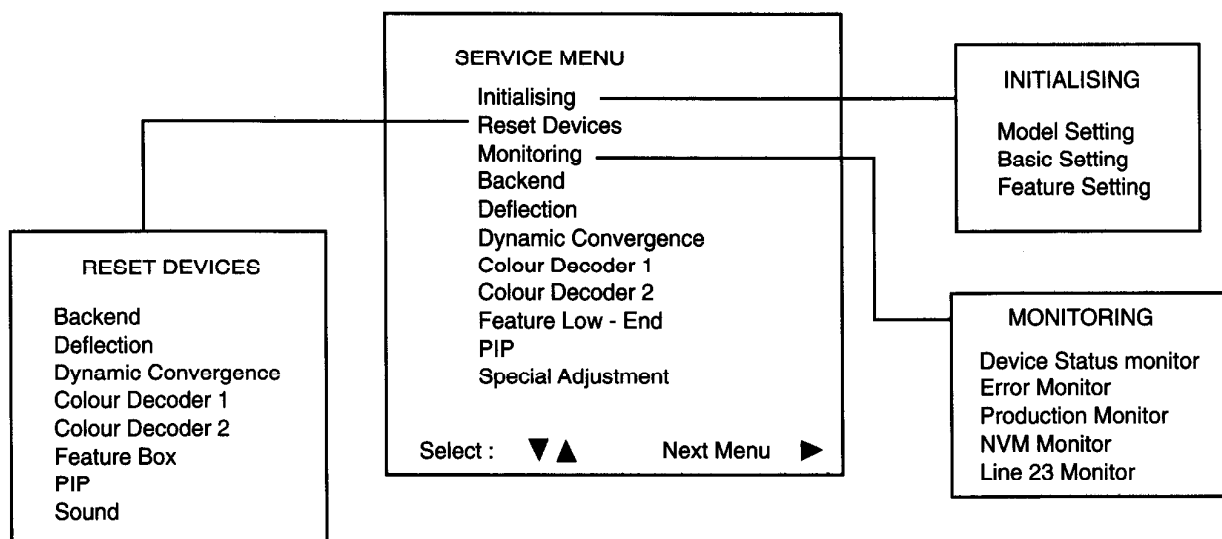
Service adjustments to this model can be performed using the supplied Remote Commander RM-891.

HOW TO ENTER INTO SERVICE MODE

1. Turn on the main power switch of the set while pressing PROG + (plus) and PROG - (minus) buttons on the top panel.



2. "TT" will appear in the upper right corner of the screen.
3. Press the 'MENU' button twice on the remote commander to obtain the service menu on the screen.



4. Push the joystick up or down on the remote commander to select the adjustment item.
5. Push the right button to proceed to the next menu.
6. If the required adjustment item is 'Deflection', push the down button to move to 'Deflection'.
7. Push the joystick to the right to enter into 'Deflection'.
8. Change the data in order to comply with each standard.

NOTE:

- Before performing any adjustments assure that the correct model has been selected in the Model Setting menu.
- After carrying out the service adjustments, to prevent the customer accessing the Service Menu switch the TV set OFF and then ON.

Model Setting	
1	KV-29FX60A/D/E
2	KV-29FX60B
3	KV-29FX60U
4	KV-29FC60A/D/E
5	KV-29FC60B
6	KV-29FC60K
7	KV-29FC60R
8	KV-29FS60A/D/E
9	KV-29FS60B
10	KV-29FS60K
11	KV-29FS60R
12	KV-28/32FX60A/D/E
13	KV-28/32FX60B
14	KV-28/32FX60K
15	KV-28/32FX60R
16	KV-28/32FX60U
17	KV-29FS60A/D/E
18	KV-29FS60B

Fig.4-1

Basic setting				
No	Descr.	Min	Max	Data
1	Sys.B/G	OFF	ON	ON
2	Sys.D/K	OFF	ON	ON
3	Sys.L	OFF	ON	ON
4	Sys I (UK)	OFF	ON	OFF
5	Sys I (IRL)	OFF	ON	OFF
6	Russian sound	OFF	ON	OFF
7	TXT Nod.option	1	4	3
8	simple PAT	OFF	ON	OFF
9	16:9 CRT	OFF	ON	OFF
10	Sub-woofer	OFF	ON	ON
11	Auto stand-by	OFF	ON	ON
12	comb-filter	OFF	ON	OFF
13	Auto YC det	OFF	ON	ON
14	Auto comb det	OFF	ON	OFF
15	AV2 Available	OFF	ON	ON
16	AV3 Available	OFF	ON	ON
17	AV4 Available	OFF	ON	OFF
18	AV3 Front & rear	OFF	ON	ON
19	SECAM Tape	OFF	ON	OFF

Fig.4-2

NOTE:

The above table is dependant on model, destination & size.

Backend					
No	Descr.	Def	Min	Max	Data
1	R-on	ON	OFF	ON	ON
2	G-on	ON	OFF	ON	ON
3	B-on	ON	OFF	ON	ON
4	D-col	OFF	OFF	ON	ON
5	Color-axis	2	0	3	2
6	Contrast	63	0	63	63
7	Limit-Luv	3	0	3	3
8	Hue	31	0	63	31
9	Colour	31	0	63	28
10	CTI -Level	2	0	3	2
11	Brightness	31	0	63	31
12	Gamma	2	0	3	2
13	Sharpness	31	0	63	44
14	LTI-Level	0	0	3	0
15	R-Drive	41	0	63	40
16	BLK-Bottom	0	0	3	0
17	G-Drive	41	0	63	38
18	ABL-TH	0	0	3	0
19	B-Drive	41	0	63	21
20	ABL-Mode	2	0	3	2
21	Sub Bright	31	0	63	32
22	VM-Level	2	0	3	2
23	R-Cutoff	31	0	63	41
24	Preover	2	0	3	2
25	G-Cutoff	31	0	63	45
26	DPIC-Level	2	0	3	2
27	B-Cutoff	31	0	63	48
28	DC-Tran	1	0	3	1
29	Sub-Cont	7	0	15	7
30	LRGB2-Lvl	12	0	15	12
31	P-Abl	15	0	15	15
32	DL-Pass	OFF	OFF	ON	OFF
33	Sharp.Fo	ON	OFF	ON	ON
34	Aging-W	OFF	OFF	ON	OFF
35	Aging-B	OFF	OFF	ON	OFF
36	CB-offset1	7	0	15	7
37	CR-offset1	7	0	15	7
38	CB-offset2	7	0	15	7
39	CR-offset2	7	0	15	7
40	Sub Colour	0	-8	8	-1

Fig.4-3

Feature setting					
No	Descr.	Min	Max	Data	
1	PIP	OFF	ON	ON	

Fig.4-4

Colour Decoder 1					
No	Descr.	Def	Min	Max	Data
1	DelayLinMd	OFF	OFF	ON	OFF
2	Gain set	1	0	3	1
3	Y-Delay	7	0	15	7
4	Phase Time	0	0	3	0
5	Vid Ident Md	OFF	OFF	ON	OFF
6	Sync Mode	OFF	OFF	ON	OFF
7	Vid Ident Sw	ON	OFF	ON	ON
8	H-Output	OFF	OFF	ON	OFF
9	Enagating	OFF	OFF	ON	OFF
10	IF Circuit	ON	OFF	ON	ON
11	GP Delay	OFF	OFF	ON	OFF

Fig.4-5

Colour Decoder 2					
No	Descr.	Def	Min	Max	Data
1	DelayLinMd	OFF	OFF	ON	OFF
2	Gain set	1	0	3	1
3	Y-Delay	7	0	15	7
4	Phase Time	0	0	3	0
5	Vid Ident Md	OFF	OFF	ON	OFF
6	Sync Mode	OFF	OFF	ON	OFF
7	Vid Ident Sw	ON	OFF	ON	ON
8	H-Output	OFF	OFF	ON	OFF
9	Enagating	OFF	OFF	ON	OFF
10	IF Circuit	ON	OFF	ON	ON
11	GP Delay	OFF	OFF	ON	OFF

Fig.4-6

Deflection					
No	Descr.	Def	Min	Max	Data
1	V-Size	31	0	63	34
2	V-Position	31	0	63	21
3	V-Comp	1	0	3	1
4	V-Linear	7	0	15	7
5	S-Corr	7	0	15	8
6	H-Size	31	0	63	29
7	EW-DC	OFF	OFF	ON	OFF
8	Pin-Amp	31	0	63	36
9	Up-Cpin	31	0	63	35
10	M-Pin	2	0	3	2
11	Lo-Cpin	31	0	63	37
12	Trapezium	7	0	15	7
13	H-Position	31	0	63	25
14	AFC-Bow	7	0	15	7
15	AFC-Angle	7	0	15	9
16	Up-Vlin	0	0	15	0
17	Lo-Vlin	0	0	15	0

Fig.4-7

Dynamic Convergence					
No	Descr.	Def	Min	Max	Data
1	Range	63	0	63	32
2	H Stat	33	0	63	33
3	H amp L	37	0	63	37
4	H amp R	36	0	63	36
5	Up Y	31	0	63	31
6	Low Y	33	0	63	33
7	Y Up L	30	0	63	30
8	Y Up R	30	0	63	30
9	Y Low L	31	0	63	31
10	Y Low R	30	0	63	30
11	Mbow Up L	31	0	63	31
12	Mbow Up R	32	0	63	32
13	Mbow Low L	32	0	63	32
14	Mbow Low R	32	0	63	32
15	V Stat	32	0	63	32
16	Linearity	128	0	255	104
17	H Centre	32	0	63	32
18	H Trap	32	0	63	32
19	Rotation	0	0	255	0
20	Focus Phase	128	0	255	128

Fig.4-8

Feature Low-End					
No	Descr.	Def	Min	Max	Data
1	F.S.FM	OFF	OFF	ON	OFF
2	G-Mode	OFF	OFF	ON	OFF
3	Picture Pos	0	0	3	0
4	Comp Mode	OFF	OFF	ON	OFF
5	CompSW	OFF	OFF	ON	OFF
6	Acqu.freq	OFF	OFF	ON	OFF
7	Still Pic	OFF	OFF	ON	OFF
8	Init	OFF	OFF	ON	OFF
9	Dis Feature	ON	OFF	ON	ON
10	Dis Vlimit	ON	OFF	ON	ON
11	Scr Fade	0	0	3	0
12	Hwe Delay	20	0	255	20
13	Auto Vshift	OFF	OFF	ON	OFF
14	Vwe Delay	0	0	127	0
15	SFR sw	OFF	OFF	ON	OFF
16	IPQ	0	0	3	0
17	D.Col Dec	OFF	OFF	ON	OFF
18	Blankfield	0	0	15	0
19	P1.5	OFF	OFF	ON	OFF
20	P1.4	OFF	OFF	ON	OFF
21	P1.3	OFF	OFF	ON	OFF
22	P1.2	OFF	OFF	ON	OFF
23	P1.1	OFF	OFF	ON	OFF
24	Set Vdba	OFF	OFF	ON	OFF
25	Set Sidep	ON	OFF	ON	ON
26	Set Hwe	OFF	OFF	ON	OFF
27	Set Clv	OFF	OFF	ON	OFF
28	Set Hddel	OFF	OFF	ON	OFF
29	Set Hblind	OFF	OFF	ON	OFF
30	Set Hre	ON	OFF	ON	ON
31	Set Hbda	ON	OFF	ON	ON
32	Set Hdav	ON	OFF	ON	ON
33	Vbdasta	0	0	255	0
34	Vsdasto	0	0	255	0
35	Msbhwesto	OFF	OFF	ON	OFF
36	Msbhwesta	OFF	OFF	ON	OFF
37	Msbvbdasto	OFF	OFF	ON	OFF
38	Msbvbdasta	OFF	OFF	ON	OFF
39	Hdavsta	40	0	255	40
40	Hdavsto	255	0	255	255

Feature Low-End(Cont.)					
No	Descr.	Def	Min	Max	Data
41	Hbdasta	223	0	255	223
42	Hbdasto	222	0	255	222
43	Hresta	38	0	255	38
44	Hresto	202	0	255	202
45	Hblindsta	31	0	255	31
46	Hblindsto	30	0	255	30
47	MsbHblindsta	OFF	OFF	ON	OFF
48	MsbHblindsto	OFF	OFF	ON	OFF
49	Msb Hresto	ON	OFF	ON	ON
50	Msb Hresta	OFF	OFF	ON	OFF
51	Msbhbdasta	ON	OFF	ON	ON
52	Msbhbdasto	ON	OFF	ON	ON
53	Msbhdavsto	ON	OFF	ON	ON
54	Msbhdavsta	OFF	OFF	ON	OFF
55	Hddel	0	0	15	0
56	Clvsta	0	0	255	0
57	Clvsto	9	0	255	9
58	Hwesta	44	0	255	44
59	Hwesto	208	0	255	208
60	Ex-Thres	OFF	OFF	ON	OFF
61	Wes	ON	OFF	ON	OFF
62	Demo mode	ON	OFF	ON	OFF
63	Limerick NR	0	0	4	0
64	Nthr	0	0	255	2
65	Wval	200	0	255	200
66	Agc Ych	203	0	255	203
67	Agc Uvch	209	0	255	209
68	Aal-Bypass	OFF	OFF	ON	OFF
69	Stby Fr	OFF	OFF	ON	OFF
70	Lsb Agc-Uv	OFF	OFF	ON	OFF
71	Lsb Agc-Y	OFF	OFF	ON	OFF
72	Vcl cor	0	0	3	0
73	Ucl cor	0	0	3	0
74	Uv cor mode	0	0	3	0
75	Uvcl tau	3	0	3	3
76	Uvcol Lvl	0	0	3	0
77	Fil Mem	OFF	OFF	ON	OFF
78	Overl Thr	1	0	3	1
79	Y delay f	4	0	7	4
80	Dcti pdxsel	ON	OFF	ON	ON

Fig.4-9

Feature Low-End (Cont.)					
No	Descr.	Def	Min	Max	Data
81	Dcti Thres	0	0	15	0
82	Dcti Gain	0	0	7	0
83	Dcti Super	ON	OFF	ON	ON
84	Dcti Fil	ON	OFF	ON	ON
85	Dcti Prot	ON	OFF	ON	ON
86	Dcti Sep	ON	OFF	ON	ON
87	Dcti Limit	2	0	3	2
88	Peak Beta	0	0	7	0
89	Peak Alpha	2	0	7	2
90	Peak Neg g	0	0	3	0
91	Peak Delta	0	0	3	0
92	Peak Tau	0	0	7	0
93	Peak Corth	0	0	15	0
94	Overlay V	0	0	15	0
95	Overlay U	0	0	15	0
96	Overlay Y	10	0	255	10
97	Sidep sta	240	0	255	240
98	Sidep eto	36	0	255	36
99	Y delay B	7	0	7	7
100	Invert UV	ON	OFF	ON	ON
101	Output Range	ON	OFF	ON	ON
102	Sidep Fdel	0	0	3	0

PIP					
No	Descr.	Def	Min	Max	Data
1	Freeze	OFF	OFF	ON	OFF
2	Frame	ON	OFF	ON	ON
3	Pipon	ON	OFF	ON	OFF
4	Seldel	1	0	15	1
5	Mixdis	ON	OFF	ON	ON
6	H-Poshi	0	0	3	0
7	H-Pos	137	0	255	137
8	V-Pos	59	0	255	59
9	Y-Delay	0	0	7	0
10	V-Dec	OFF	OFF	ON	OFF
11	H-Dec	OFF	OFF	ON	OFF
12	Insvh	ON	OFF	ON	ON
13	Chrins	ON	OFF	ON	ON
14	Pmod	0	0	3	0
15	Imod	0	0	3	0
16	Clisw	ON	OFF	ON	ON
17	H side	4	0	15	4
18	Vsileq	OFF	OFF	ON	OFF
19	Vsided	0	0	31	0
20	Parasynd	ON	OFF	ON	ON
21	Vspisq	OFF	OFF	ON	OFF
22	Vspdel	10	0	31	10
23	Con	1	0	15	1
24	Fry	8	0	15	8
25	Frv	3	0	15	3
26	Fru	4	0	15	4
27	Sel Down	OFF	OFF	ON	OFF
28	Frwidv	1	0	3	1
29	Frwidth	2	0	7	2
30	Mat	4	0	7	4
31	Daconst	OFF	OFF	ON	OFF
32	Plitc	1	0	3	1
33	Dacontle	OFF	OFF	ON	OFF
34	Left	83	0	255	83
35	RightHi	1	0	3	1
36	Right	192	0	255	192
37	Up	46	0	255	46
38	Down	189	0	255	189

Fig.4-10

Sound					
No	Descr.	Def	Min	Max	Data
1	Ref.Level	40	0	20	40
2	Auto-gain	ON	OFF	ON	ON
3	Ana-in	0	0	1	0
4	Corr-mute	ON	OFF	ON	ON
5	Clock out	ON	OFF	ON	ON
6	AM-gain	ON	OFF	ON	ON
7	Clip mode	0	0	2	0
8	SCART1 Vol	79	0	127	79
9	SCART2 Vol	79	0	127	79
10	SCART Pr	27	0	127	27
11	Izs1-pr	16	0	127	16
12	Izs2-pr	16	0	127	16
13	FM pr	27	0	127	27
14	BG Nic-pr	53	0	127	53
15	L Nic-pr	59	0	127	59
16	DK Nic-pr	53	0	127	53
17	I Nic-pr	97	0	127	97
18	Irl Nic-pr	97	0	127	97
19	AVC-Decay	2	0	8	2
20	Subw-vol	0	0	-127	0
21	Subw-freq	20	5	40	20
22	Subw-Hpuss	OFF	OFF	ON	OFF
23	Spat-stre	127	0	-1	127
24	Spat-Coeff	0	0	8	0
25	Bass offs	0	-3	3	0
26	Treble offs	0	-3	3	0
27	Loudn offs	0	0	9	0
28	Hp-voloffs	-2	-5	5	-2
29	M-S Limit	30	-128	127	30
30	M-B Limit	-30	-128	127	-30
31	S-M Limit	12	-128	127	12
32	S-B Limit	-20	-128	127	-20
33	B-M Limit	-12	-128	127	-12
34	B-S Limit	20	-128	127	20
35	Err.Max	40	0	255	40
36	Err.Min	14	0	255	18

Fig.4-11

Special Adjustment				
No	Descr.	Min	Max	Data
1	RGB Level	0	7	0
2	RGB Gain	0	31	9
3	RGB PatLevel	0	7	7
4	RGB Patgain	0	31	31
5	RGB H-position	-10	10	-1
6	Extra Fw	0	255	255
7	EPG Chks Check	OFF	ON	ON
8	Slicer High	OFF	ON	ON
9	FCW Wide	OFF	ON	ON
10	High PII	OFF	ON	OFF
11	Panic offset	0	2	0
12	Wide Mute	OFF	ON	ON

Fig.4-12

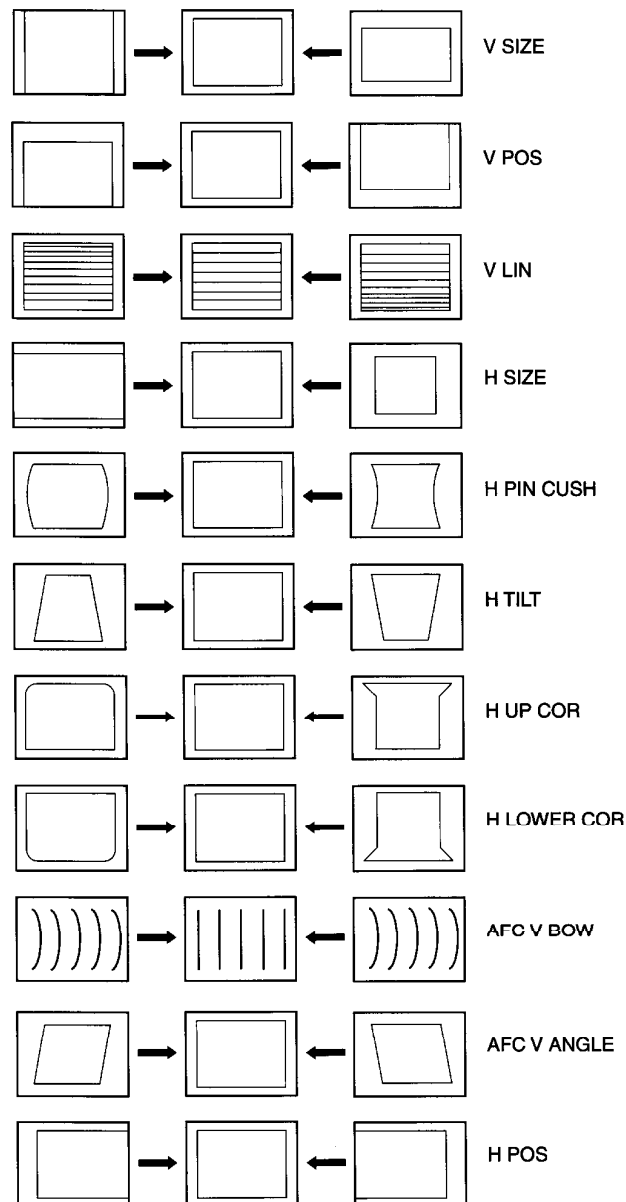
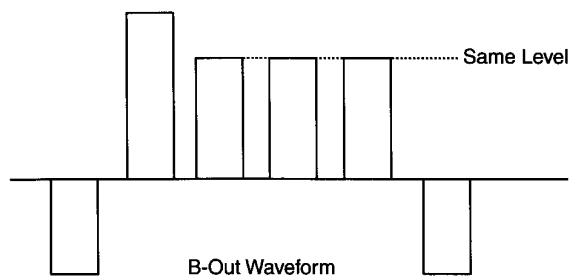
DEFLECTION SYSTEM ADJUSTMENT

1. Enter into the service mode and select 'Deflection'. The 'Deflect' adjustment menu will be displayed.
2. Select and adjust each item to obtain the optimum image.

4-2.VOLUME ELECTRICAL ADJUSTMENTS

Sub Colour Adjustment

1. Input a PAL colour bar signal.
2. Connect an oscilloscope to CN5400 pin 5 on the C board.
3. Enter into the 'SERVICE MODE'.
4. Choose 'Backend'.
5. Adjust Sub Colour data so that the right sides of the waveforms are of equal height.



4-3. TEST MODE 2:

Is available by pressing 'TEST' button twice, OSD 'TT' appears. The functions described below are available by pressing the two numbers. To release the Test mode 2, press 0, 10, 20 ... twice or switch the TV set into Stand-by Mode. Pressing the two Local Control buttons (+ and -) during Power ON will also switch into 'TT' mode.

In 'TT' mode, it is possible to remove the Menu from the screen by pressing the Speaker Off button once. Pressing the Speaker OFF button a second time will cause the menu to reappear. The Function is kept even when the menu is not displayed !!.

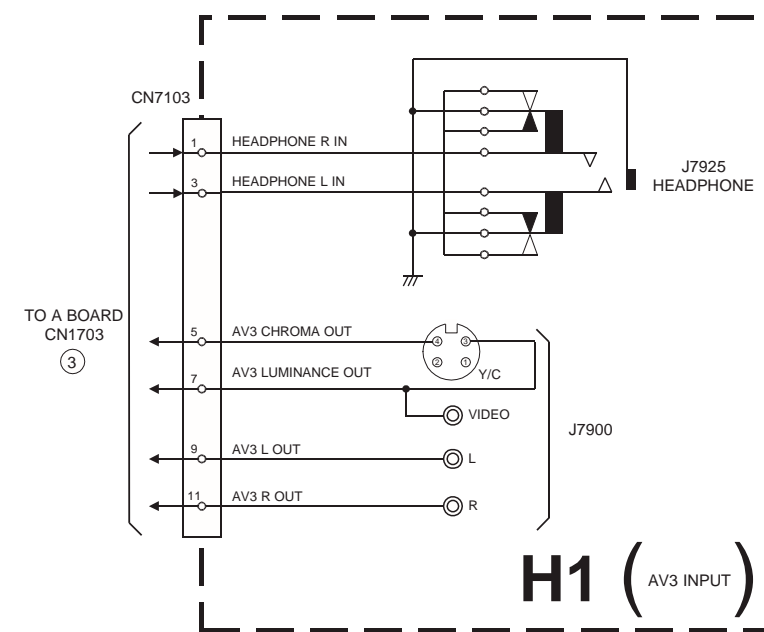
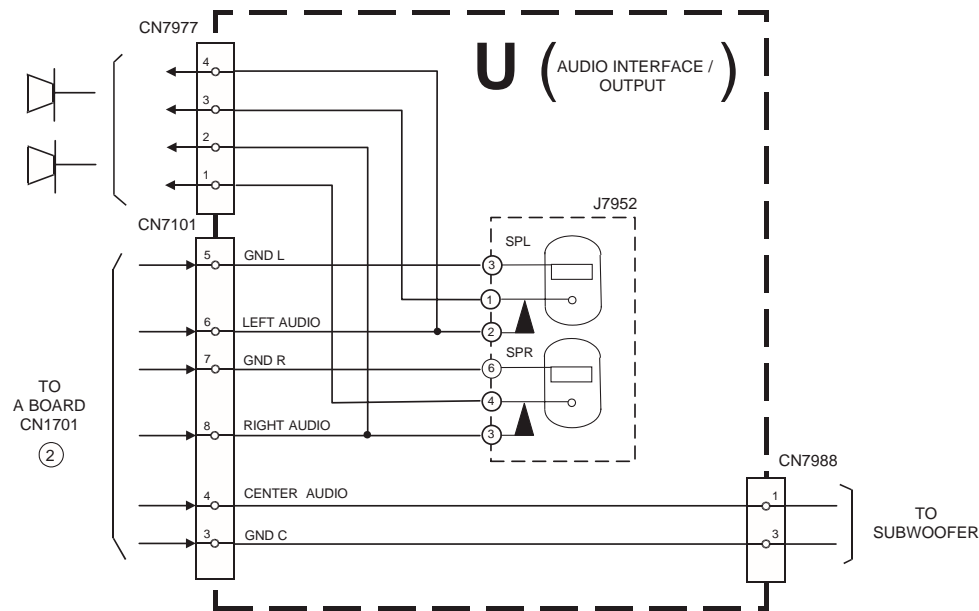
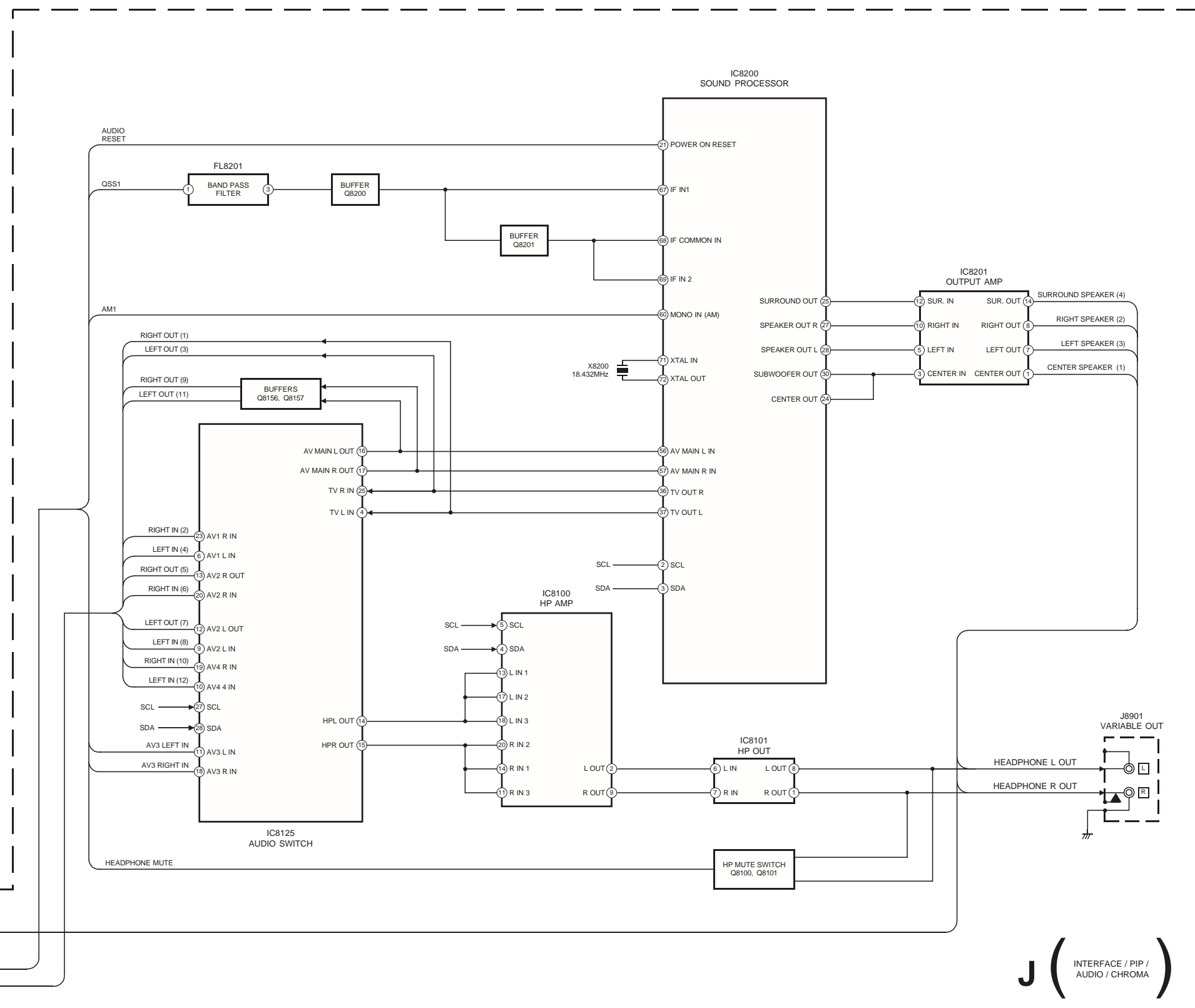
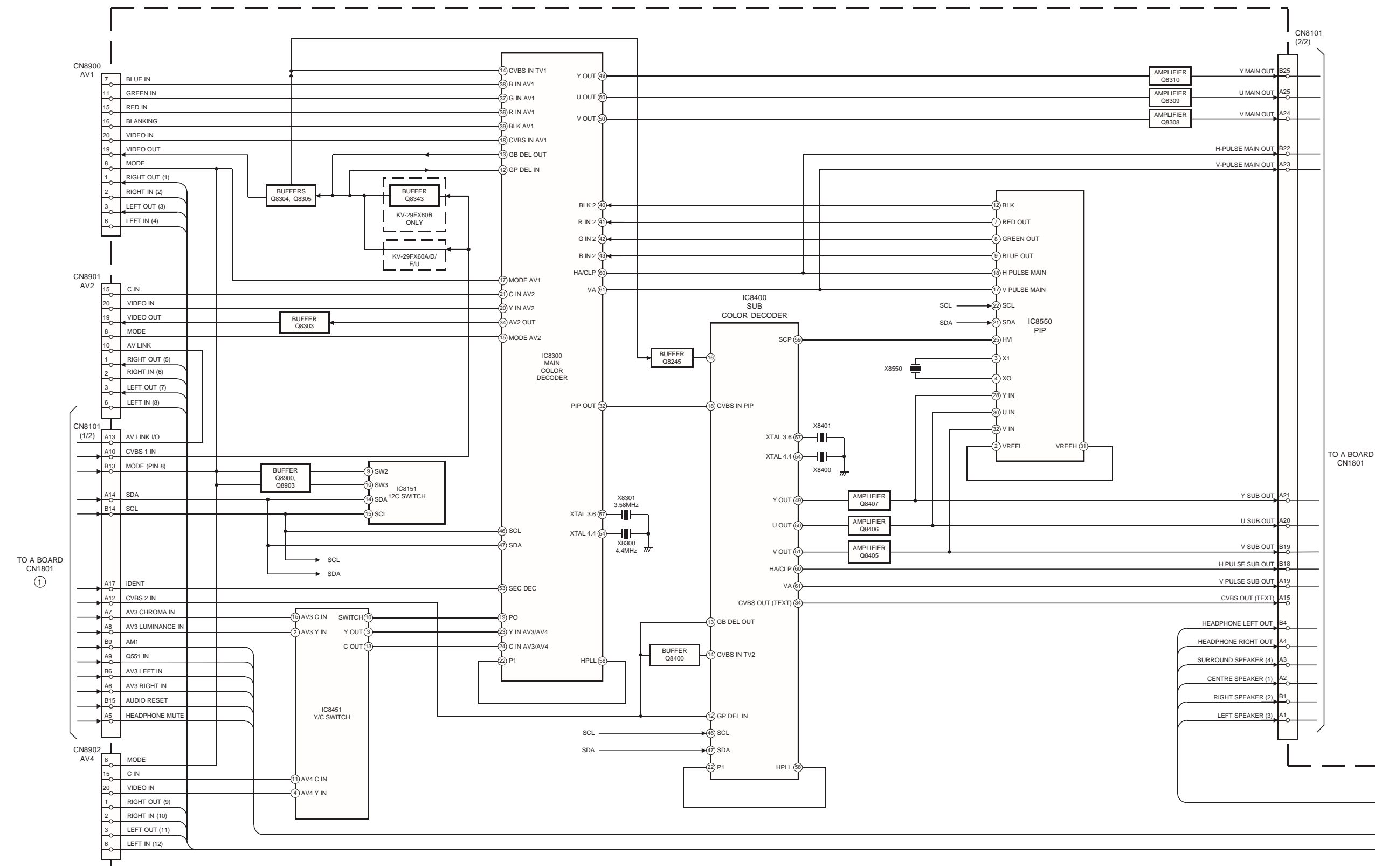
00	Switch back to normal mode - 'TT' mode off
01	Set picture maximum
02	Set picture minimum
03	Set speaker/headphone Volume to 30%
04	Set speaker/headphone Volume to 50%
05	Set speaker/headphone Volume to 65%
06	Set speaker/headphone Volume to 80%
07	Ageing Mode
08	Shipping Condition
09	Language Reset
10	No function
11	Sub picture adjustment
12	Sub colour adjustment
13	Display software version and TV set configuration
14	Production Info Display
15	Picture Rotation
16	Picture level 50%
17	Audio mute on
18	No function
19	Sub brightness adjustment
20	See 'TT10'
21	Destination A includes text settings, display TV status
22	Destination L includes text settings, display TV status
23	Destination E includes text settings, display TV status
24	Destination U includes text settings, display TV status
25	Destination D includes text settings, display TV status
26	Destination B includes text settings, display TV status
27	Destination K includes text settings, display TV status
28	Destination R includes text settings, display TV status
30	See 'TT10'
31	Geometry Adjustment 1
32	Geometry Adjustment 2
33	Error monitor
34	No function
35	CRT 4:3 < > 16:9 ; Display TV status
36	Line 23 detection switch
37	Velocity Modulation (VM) test
38	No function
39	No function
40	See 'TT10'

41	Screen mode check
42	Re initialise geometry
43	No function
44	No function
45	No function
46	Reserved for dealer commander
47	Re initialise NVM
48	Set NVM as non virgin
49	Set NVM as virgin
50	See 'TT10'
51	Set Dolby volume to 90%
52	Dolby on left speaker only
53	Dolby on right speaker only
54	Dolby on left centre only
55	Dolby on surround speaker only
56	No function
59	
60	See 'TT10'
61	Service mode
62	Production mode
65	Reset error codes
68	Ignore errors on
69	Ignore errors off
70	See 'TT10'
71	No function
72	
73	Clear programs
74	No function
79	
80	See 'TT10'
81	PAP H adjustment left image
82	PAP H adjustment right image
83	No function
86	
87	Personal ID reset
88	Parental Lock off
89	No function
90	See 'TT10'

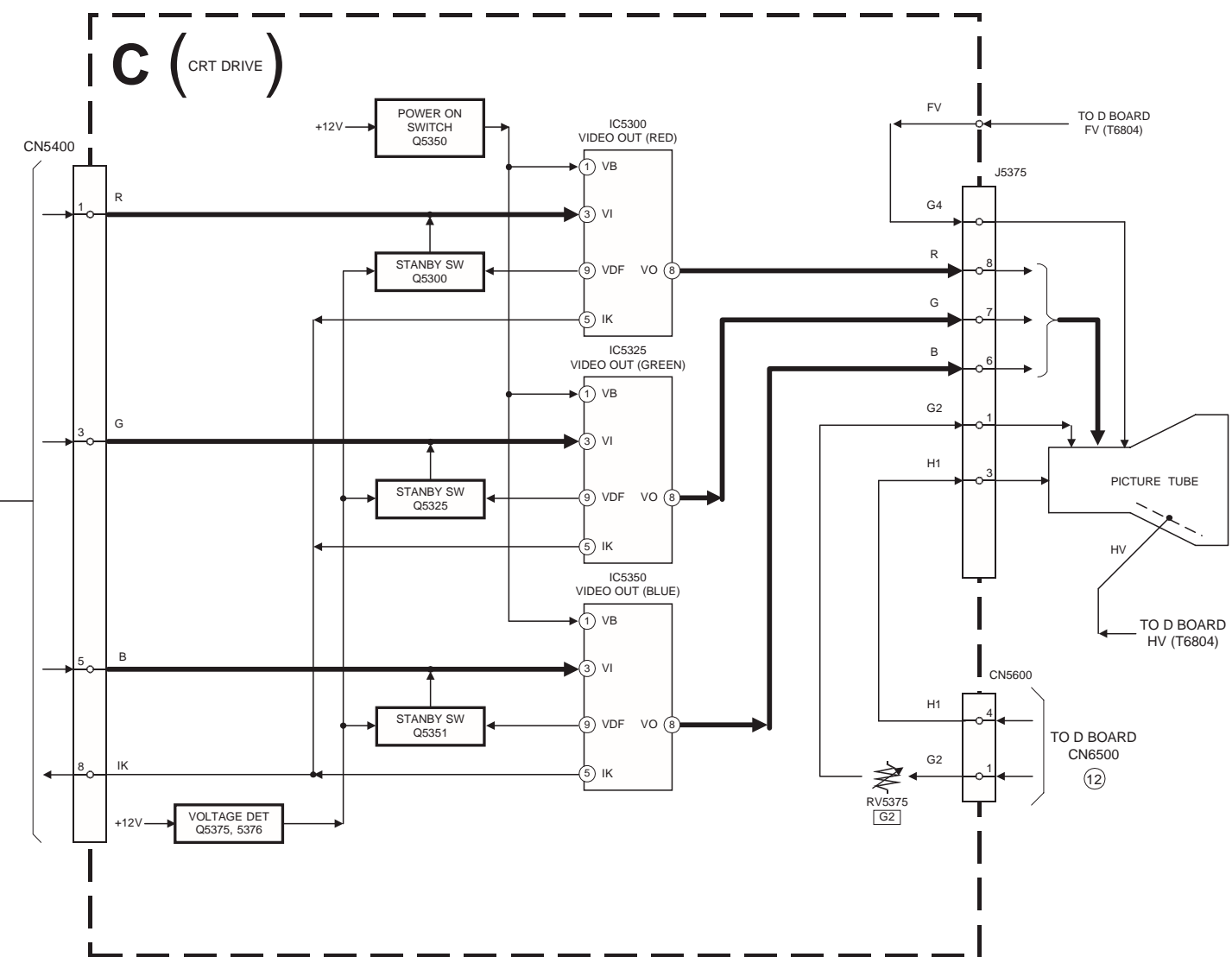
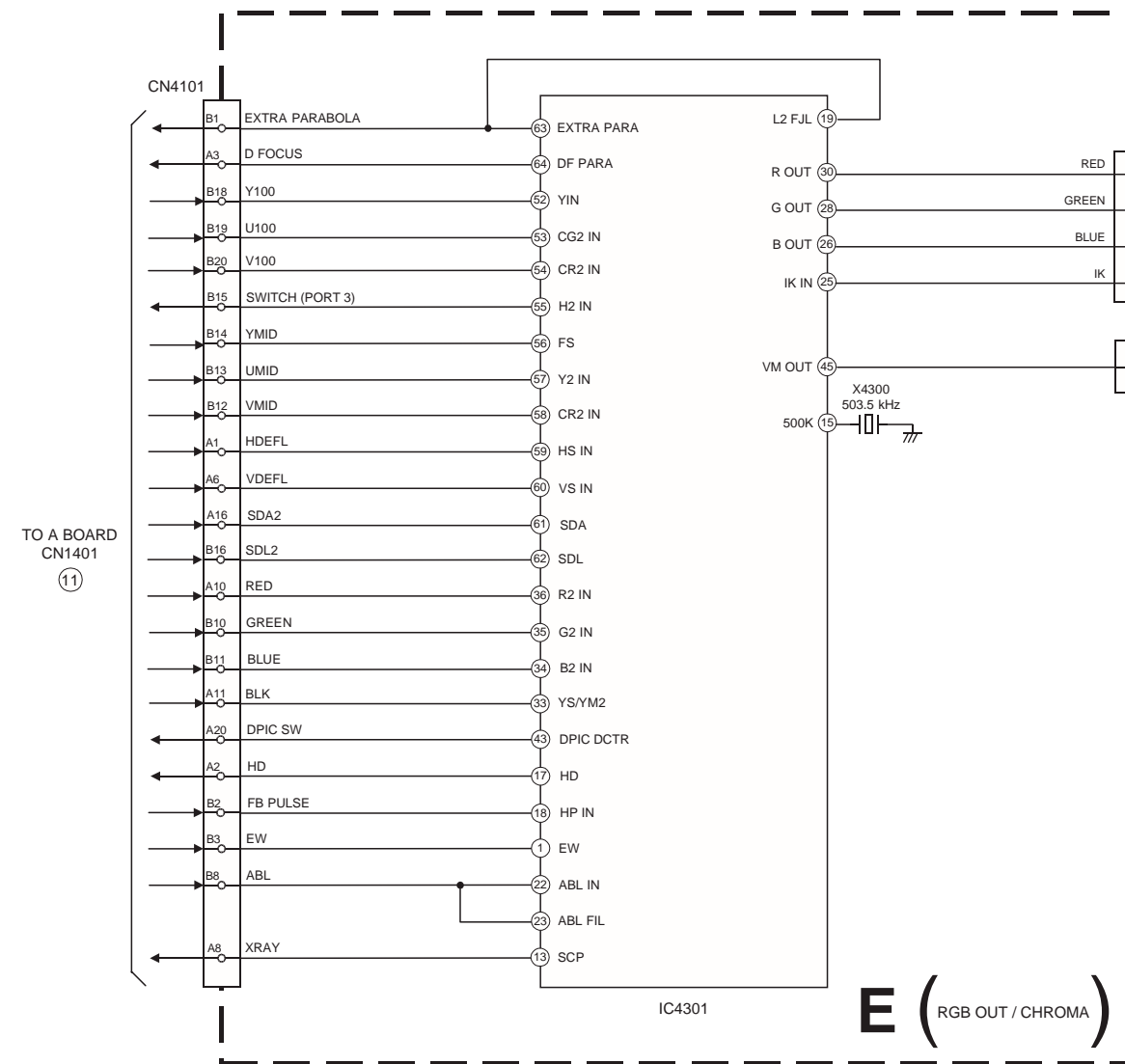
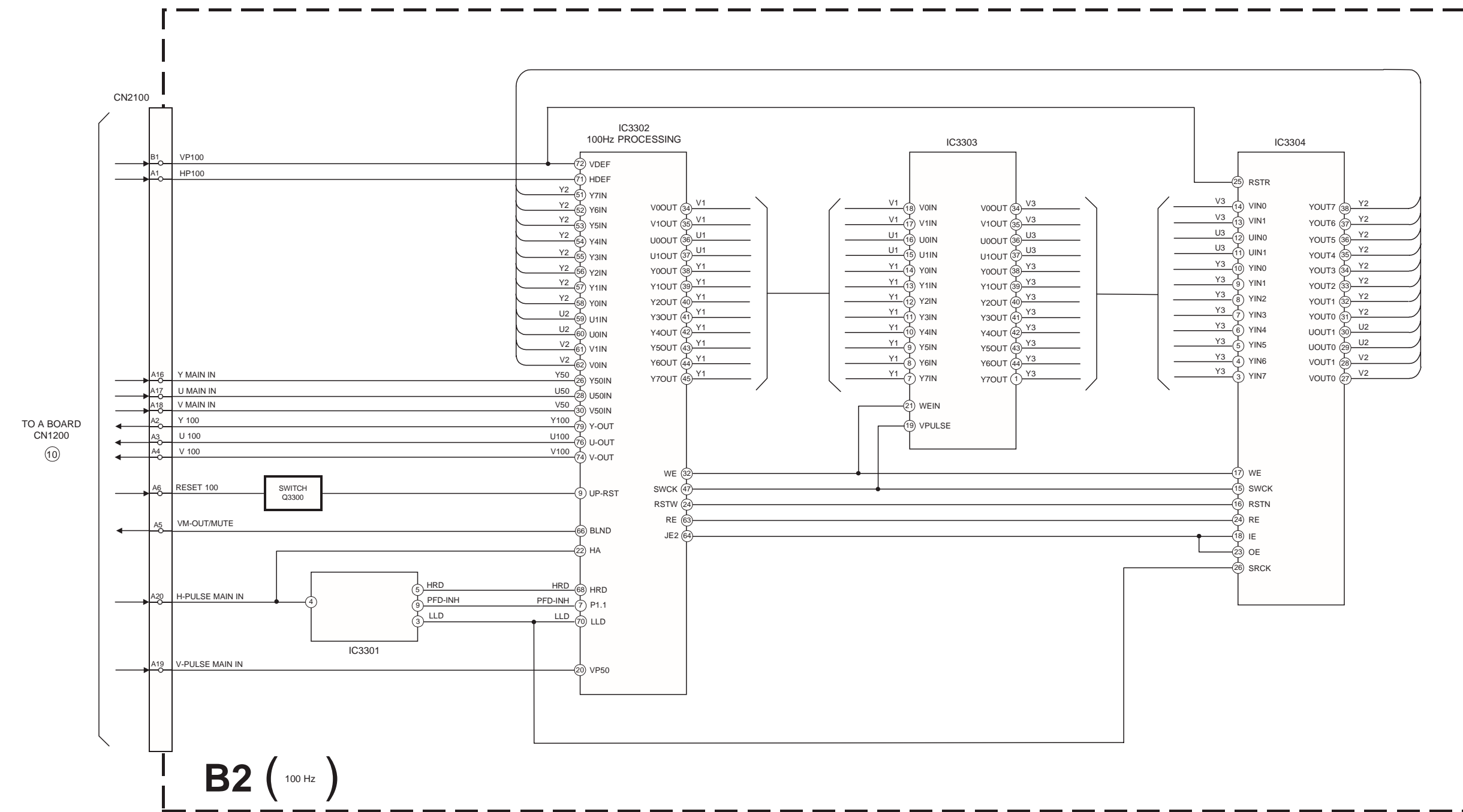
Memo

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.

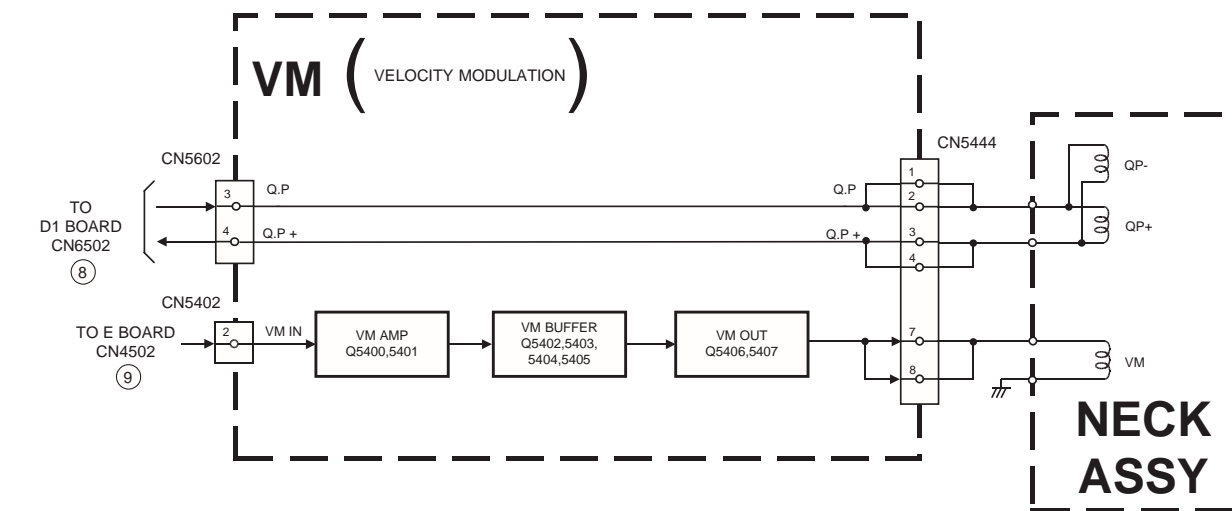
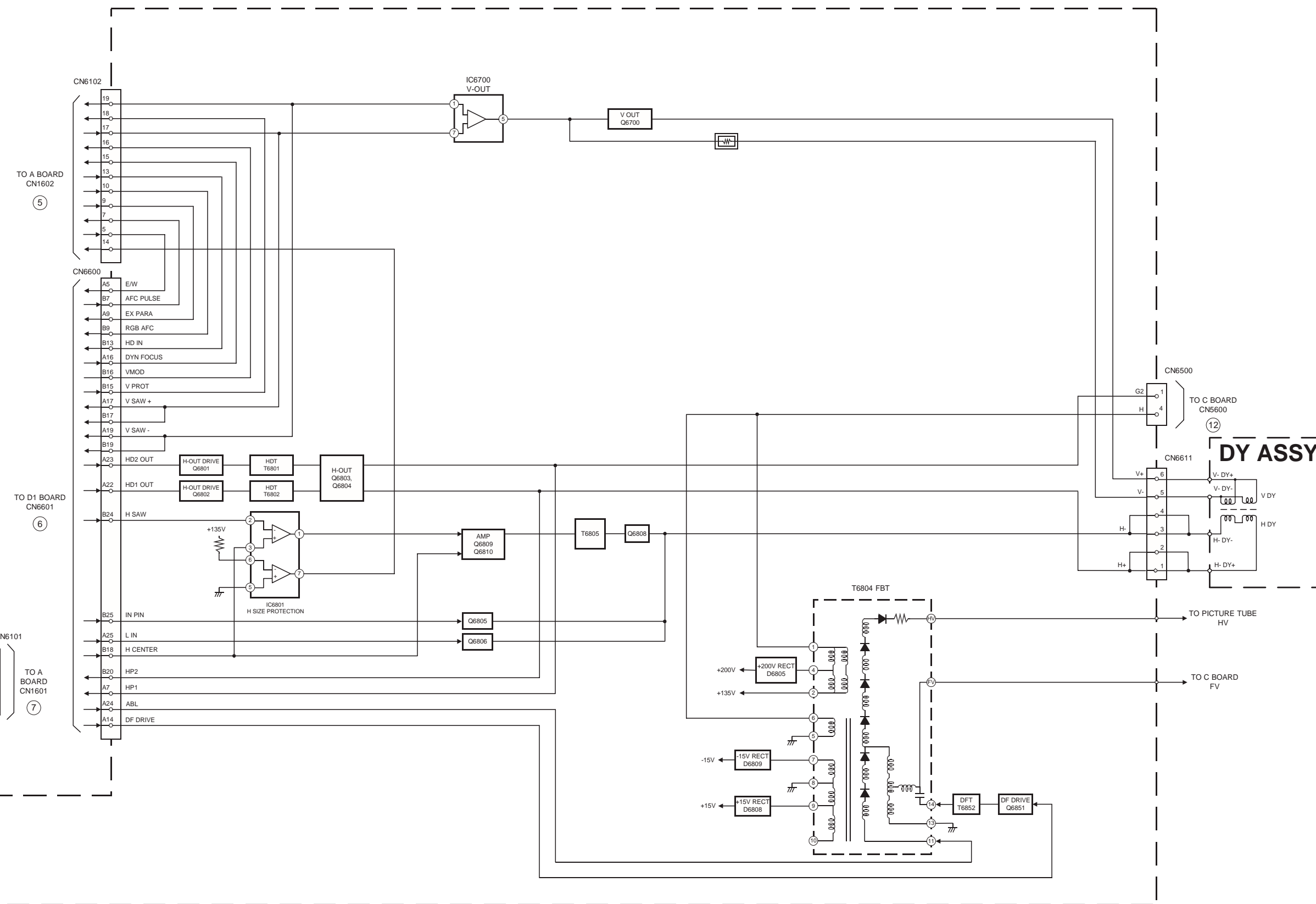
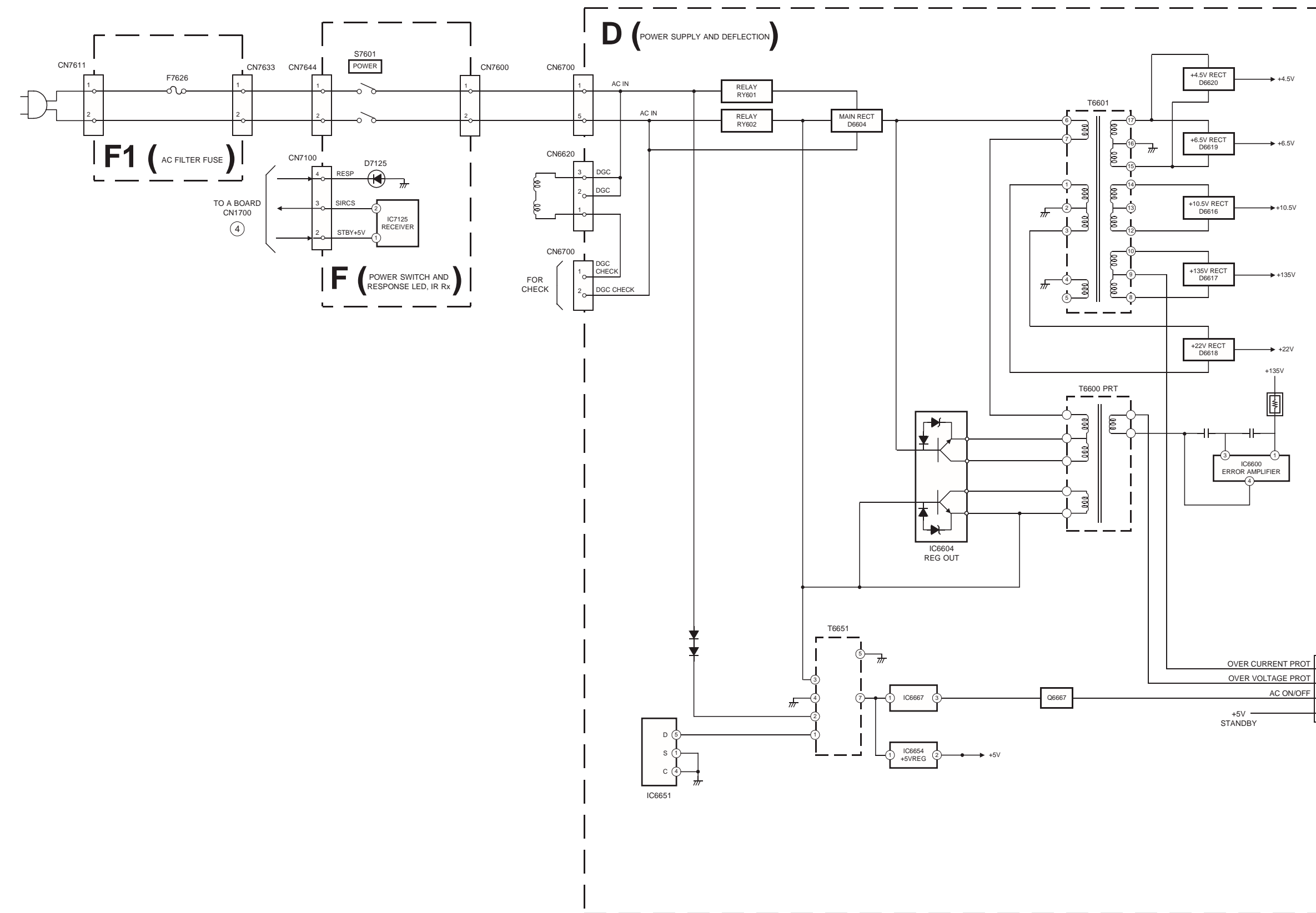
5-1 BLOCK DIAGRAMS (1)



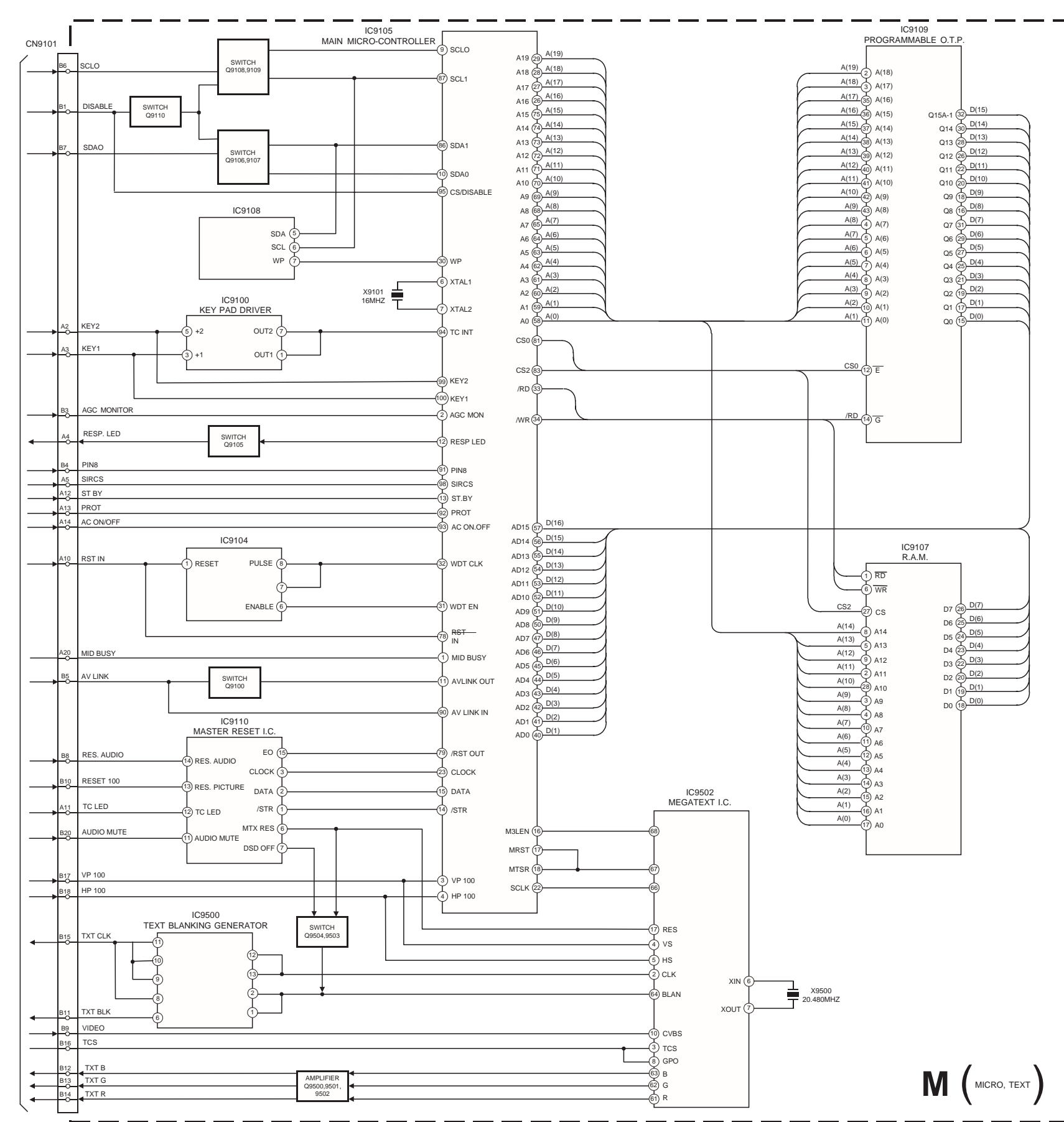
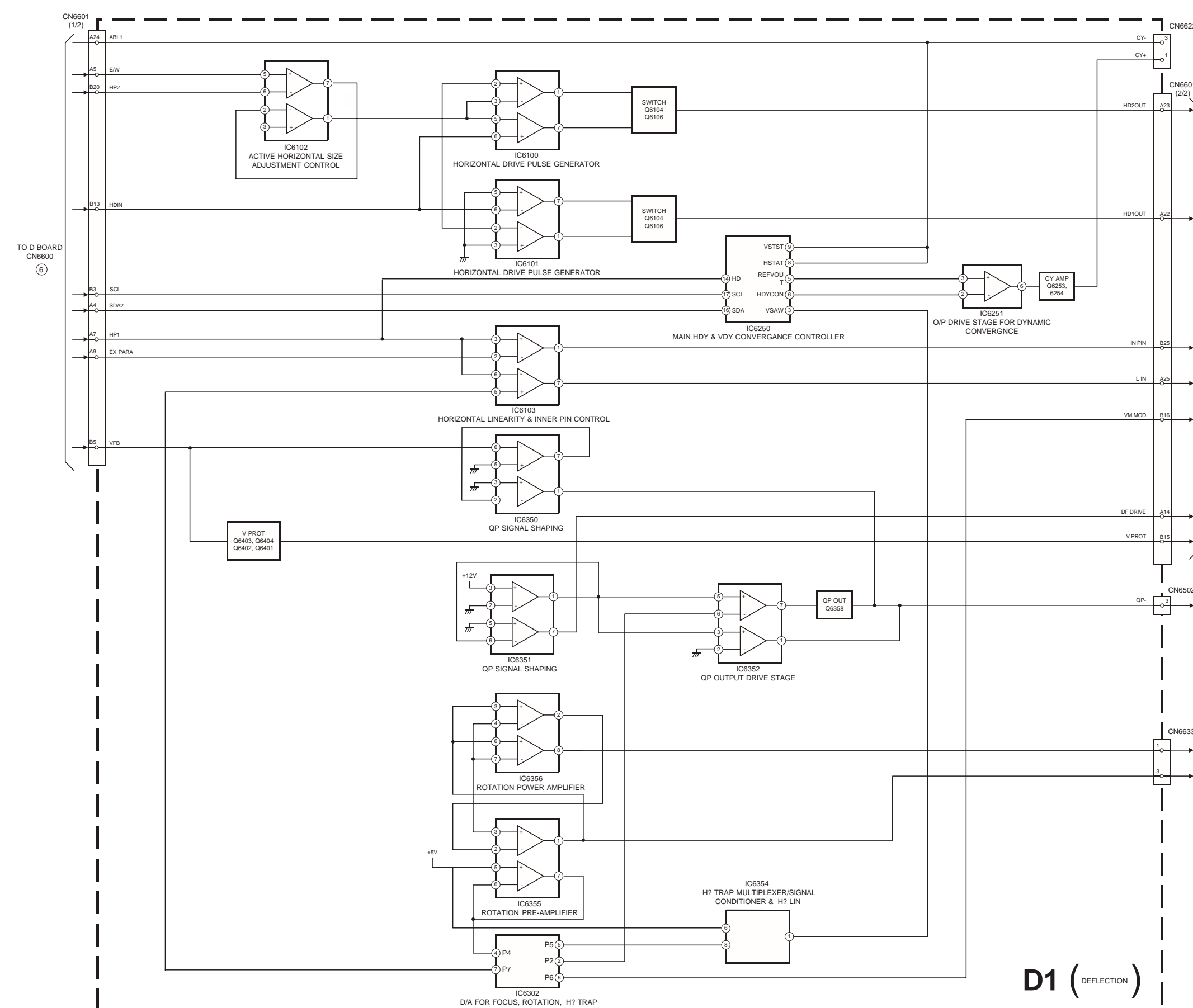
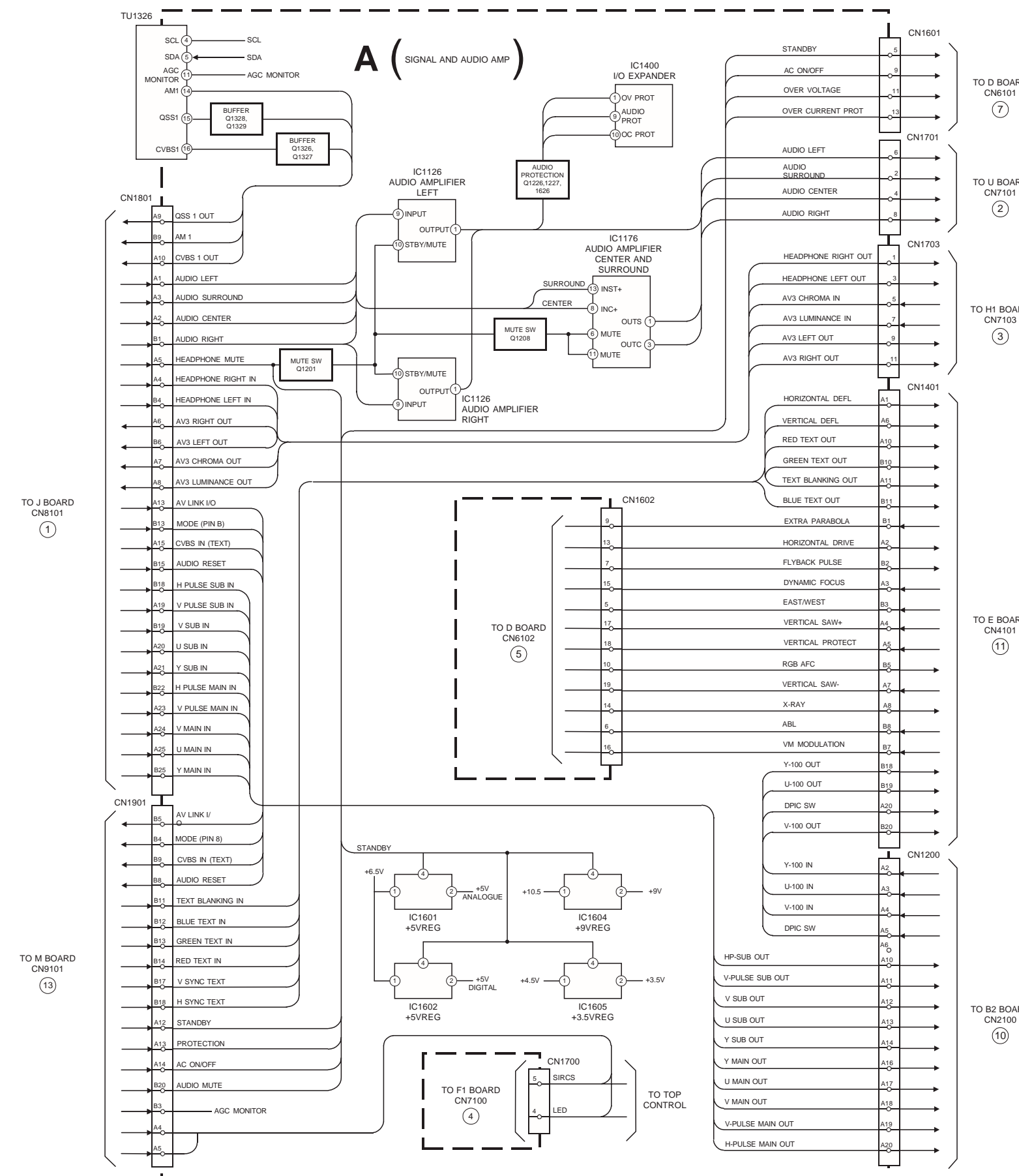
5-1 BLOCK DIAGRAMS (2)



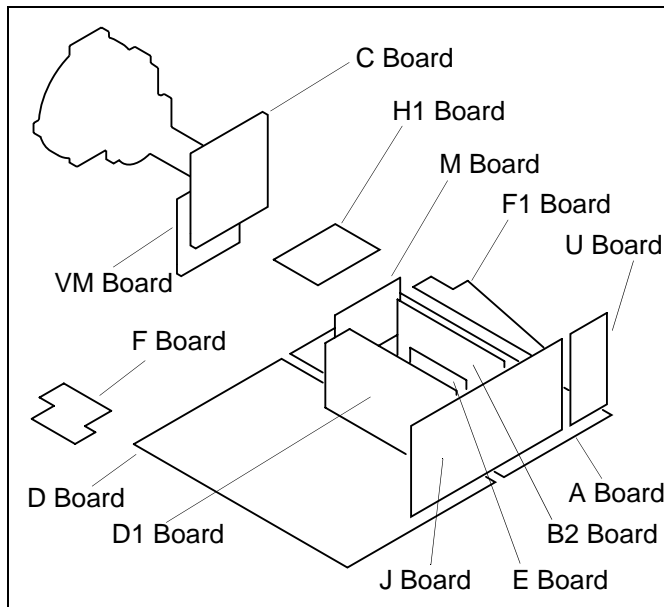
5-1 BLOCK DIAGRAMS (3)



5-1 BLOCK DIAGRAMS (4)



5-2. CIRCUIT BOARD LOCATION



5-3. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note :

- All capacitors are in μF unless otherwise noted.
- pF : μF 50WV or less are not indicated except for electrolytic types.
- Indication of resistance, which does not have one for rating electrical power, is as follows.

Pitch : 5mm
Electrical power rating : 1/4W

- Chip resistors are 1/10W
- All resistors are in ohms.
k = 1000 ohms, M = 1000,000 ohms
- : nonflammable resistor.
- : fusible resistor.
- : internal component.
- : panel designation or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- All voltages are in Volts.
- Readings are taken with a 10Mohm digital mutimeter.
- Readings are taken with a color bar input signal.
- Voltage variations may be noted due to normal production tolerences.
- : B + bus.
- : B - bus.
- : RF signal path.
- : earth - ground.
- : earth - chassis.

Reference Information

RESISTOR	RN	: METAL FILM
	RC	: SOLID
	FPRD	: NON FLAMMABLE CARBON
	FUSE	: NON FLAMMABLE FUSIBLE
	RS	: NON FLAMMABLE METAL OXIDE
	RB	: NON FLAMMABLE CEMENT
	RW	: NON FLAMMABLE WIREWOUND
		: ADJUSTMENT RESISTOR
COIL	LF-8L	: MICRO INDUCTOR
CAPACITOR	TA	: TANTALUM
	PS	: STYROL
	PP	: POLYPROPYLENE
	PT	: MYLAR
	MPS	: METALIZED POLYESTER
	MPP	: METALIZED POLYPROPYLENE
	ALB	: BIPOLAR
	ALT	: HIGH TEMPERATURE
	ALR	: HIGH RIPPLE

Note : The components identified by shading and marked are critical for safety. Replace only with the part numbers specified in the parts list.

Note : Les composants identifiés par une trame et par une marque sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

A BOARD * MARK

Ref	29FX60A	29FX60B	29FX60D	29FX60E	29FX60U
TU1326	TUNER/VIF (AEP)	TUNER/VIF (FR)	TUNER/VIF (AEP)	TUNER/VIF (AEP)	TUNER/VIF (UK)

J BOARD * MARK

Ref	29FX60A	29FX60B	29FX60D	29FX60E	29FX60U
Q8311	-	2SC2412K-T- 146-R	-	-	-
R8346	SHORT 0	-	SHORT 0	SHORT 0	SHORT 0
R8347	-	100	-	-	-
R8348	-	SHORT 0	-	-	-

A BOARD

IC		DIODE	
IC1126	F - 6	D1100	A - 2
IC1151	F - 5	D1101	B - 2
IC1176	G - 15	D1102	B - 2
IC1400	B - 5	D1103	B - 4
IC1601	C - 3	D1401	E - 4
IC1602	B - 3	D1402	D - 5
IC1603	A - 11	D1403	D - 4
IC1604	D - 3	D1404	D - 5
IC1605	F - 3	D1626	B - 6
TRANSISTOR		D1627	C - 5
Q1100	A - 2	D1629	E - 1
Q1201	D - 6		
Q1202	E - 6		
Q1203	F - 9		
Q1204	F - 9		
Q1226	G - 9		
Q1227	G - 9		
Q1326	E - 11		
Q1327	E - 11		
Q1328	E - 10		
Q1329	E - 10		
Q1400	D - 4		
Q1626	B - 5		

C BOARD

IC	
IC5300	B - 6
IC5325	C - 3
IC5350	C - 1
TRANSISTOR	
Q5300	B - 6
Q5325	B - 5
Q5350	A - 1
Q5351	C - 2
Q5375	A - 4
Q5376	A - 4
DIODE	
D5300	B - 6
D5302	C - 5
D5325	B - 4
D5326	B - 4
D5327	C - 4
D5350	B - 2
D5351	B - 1
D5353	C - 1
D5375	A - 5
D5376	A - 5
D5377	A - 1
D5378	B - 1
D5379	E - 5
D5380	E - 5
D5381	F - 2

D BOARD

IC		D6613	D - 12
IC6600	F - 9	D6615	C - 12
IC6604	H - 11	D6616	D - 9
IC6651	G - 13	D6617	D - 8
IC6652	A - 7	D6618	B - 11
IC6653	A - 9	D6619	B - 8
IC6654	D - 12	D6620	B - 9
IC6667	E - 14	D6621	B - 12
IC6700	D - 6	D6623	E - 8
IC6801	A - 3	D6624	B - 13
TRANSISTOR		D6625	A - 12
Q6600	J - 6	D6627	A - 10
Q6602	G - 9	D6628	A - 13
Q6603	G - 8	D6629	B - 12
Q6605	D - 12	D6651	I - 13
Q6606	A - 13	D6652	H - 13
Q6607	E - 8	D6653	H - 13
Q6651	E - 13	D6654	G - 12
Q6652	E - 14	D6655	G - 13
Q6667	E - 13	D6656	E - 13
Q6676	D - 13	D6658	H - 13
Q6677	D - 14	D6659	F - 13
Q6678	D - 13	D6676	C - 13
Q6679	C - 13	D6677	C - 13
Q6680	C - 13	D6678	C - 13
Q6681	D - 13	D6679	D - 13
Q6700	C - 6	D6681	E - 13
Q6801	H - 2	D6700	C - 5
Q6802	E - 6	D6701	H - 2
Q6803	F - 2	D6803	B - 3
Q6804	D - 5	D6804	C - 3
Q6805	E - 13	D6805	G - 3
Q6806	D - 3	D6806	H - 3
Q6807	B - 13	D6807	G - 7
Q6809	A - 2	D6808	G - 8
Q6810	A - 2	D6809	B - 13
Q6851	I - 2	D6811	D - 3
DIODE		D6812	B - 2
D6600	J - 7	D6813	B - 2
D6601	J - 7	D6851	H - 2
D6602	J - 6	D6852	1 - 2
D6603	D - 12		
D6604	I - 11		
D6610	C - 12		

D1 BOARD

IC		Q6350	E - 8
IC6100	C - 9	Q6351	E - 3
IC6101	C - 12	Q6352	D - 3
IC6102	D - 11	Q6353	C - 2
IC6103	G - 12	Q6354	C - 2
IC6250	D - 8	Q6356	G - 4
IC6251	C - 8	Q6258	B - 2
IC6302	D - 5	Q6401	F - 7
IC6350	D - 3	Q6402	G - 6
IC6351	G - 3	Q6403	F - 5
IC6352	G - 1	Q6404	G - 6
IC6353	E - 5	Q6455	C - 8
IC6354	C - 5	Q6465	B - 5
IC6355	A - 5	DIODE	
IC6356	A - 6	D6100	D - 12
TRANSISTOR		D6101	E - 12
Q6100	D - 11	D6102	D - 10
Q6101	C - 11	D6104	E - 9
Q6102	C - 12	D6105	E - 9
Q6104	C - 9	D6106	E - 8
Q6105	B - 11	D6108	F - 11
Q6106	C - 9	D6127	D - 6
Q6107	E - 11	D6128	E - 6
Q6108	B - 10	D6129	D - 8
Q6110	C - 8	D6198	D - 8
Q6118	G - 10	D6253	B - 8
Q6119	E - 8	D6254	B - 7
Q6120	E - 9	D6350	F - 4
Q6122	E - 9	D6351	F - 4
Q6123	E - 12	D6352	E - 1
Q6125	H - 11	D6353	C - 2
Q6126	H - 11	D6354	D - 2
Q6127	E - 6	D6355	E - 3
Q6128	F - 12	D6358	B - 2
Q6130	H - 11	D6359	B - 3
Q6131	G - 12	D6401	F - 7
Q6201	F - 10	D6402	F - 6
Q6202	F - 10	D6403	A - 5
Q6250	E - 8	D6404	A - 4
Q6251	E - 8	D6405	A - 5
Q6252	B - 10		
Q6253	B - 11		
Q6254	C - 2		

J BOARD

IC		Q8461	B - 15
IC8100	F - 15	Q8900	D - 16
IC8101	F - 15	Q8901	C - 17
IC8125	F - 14	Q8903	D - 16
IC8151	D - 22	DIODE	
IC8201	E - 24	D8125	F - 12
IC8202	D - 23	D8126	F - 12
IC8300	E - 19	D8127	F - 11
IC8400	C - 22	D8128	F - 11
IC8451	A - 15	D8129	E - 12
IC8550	B - 19	D8130	E - 12
IC8601	D - 20	D8131	E - 11
IC8602	E - 20	D8200	D - 2
IC8603	A - 23	D8201	D - 2
IC8604	A - 21	D8202	E - 10
TRANSISTOR		D8203	D - 10
Q8200	E - 23	D8432	B - 4
Q8201	E - 24	D8450	F - 1
Q8202	E - 23	D8451	F - 1
Q8303	C - 19	D8550	C - 20
Q8304	C - 20	D8900	C - 12
Q8305	D - 20	D8902	C - 11
Q8307	D - 18	D8903	C - 11
Q8308	E - 18	D8904	B - 11
Q8309	E - 18	D8905	B - 12
Q8310	D - 18	D8906	B - 12
Q8311	C - 20	D8907	C - 10
Q8343	F - 19	D8908	C - 10
Q8400	B - 22	D8909	C - 11
Q8401	C - 20	D8910	B - 11
Q8403	C - 22	D8911	C - 10
Q8404	C - 22	D8912	C - 9
Q8405	C - 20	D8913	C - 10
Q8406	C - 20	D8914	B - 10
Q8407	C - 20	D8915	C - 9
Q8425	A - 22	D8922	D - 16
Q8450	A - 15	D8923	D - 16
Q8453	A - 15		
Q8456	A - 15		
Q8459	B - 15		

M BOARD

IC	
IC9100	C - 5
IC9104	D - 5
IC9105	E - 6
IC9107	E - 5
IC9108	C - 6
IC9109	F - 5
IC9110	C - 5
IC9500	A - 1
IC9502	B - 6
TRANSISTOR	
Q9100	D - 3
Q9101	C - 3
Q9102	D - 3
Q9103	D - 3
Q9105	D - 1
Q9106	C - 2
Q9107	C - 2
Q9108	C - 2
Q9109	B - 5
Q9110	C - 2
Q9500	B - 1
Q9501	B - 2
Q9502	C - 2
Q9503	E - 3
Q9504	A - 1
DIODE	
D9104	D - 3
D9107	A - 3
D9108	C - 1
D9109	C - 1
D9110	C - 2
D9111	C - 1

A [SIGNAL AND AUDIO AMP]

J [INTERFACE / PIP /
AUDIO / CHROMA]

U [AUDIO INTERFACE / OUTPUT]

H1 [AV3 INPUT]

D [POWER SUPPLY AND DEFLECTION]

D1 [DEFLECTION]

F [POWER SWITCH AND
RESPONSE LED, IR Rx]

M [MICRO, TEXT]

E [RGB OUT / CHROMA]

C [CRT DRIVE]

B2 [100 Hz]

F1 [AC FILTER FUSE]

VM [VELOCITY MODULATION]

BLOCK DIAGRAM (1)

BLOCK DIAGRAM (2)

BLOCK DIAGRAM (3)

BLOCK DIAGRAM (4)

SECTION 5

DIAGRAMS

VM Board

B2 Board <Conductor Side>

B2 Board <Component Side>

D1 Board

M Board <Conductor Side>

M Board <Component Side>

H1 Board <Conductor Side>

F1 Board <Conductor Side>

F1 Board <Component Side>

D Board

E Board

C Board

J Board <Conductor Side>

J Board <Component Side>

U Board <Conductor Side>

U Board <Component Side>

A Board <Conductor Side>

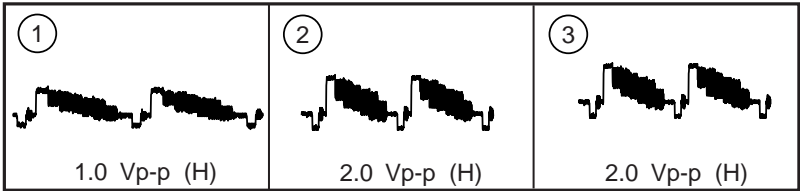
A Board <Component Side>

E Board <Conductor Side>

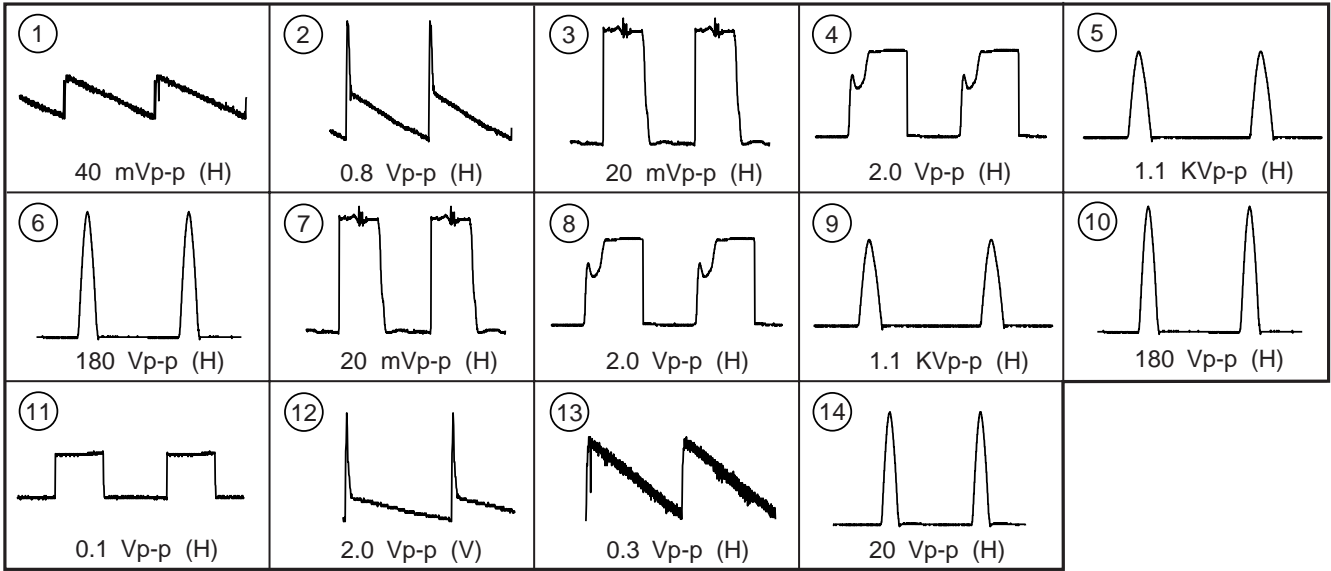
E Board <Component Side>

H1 Board <Component Side>

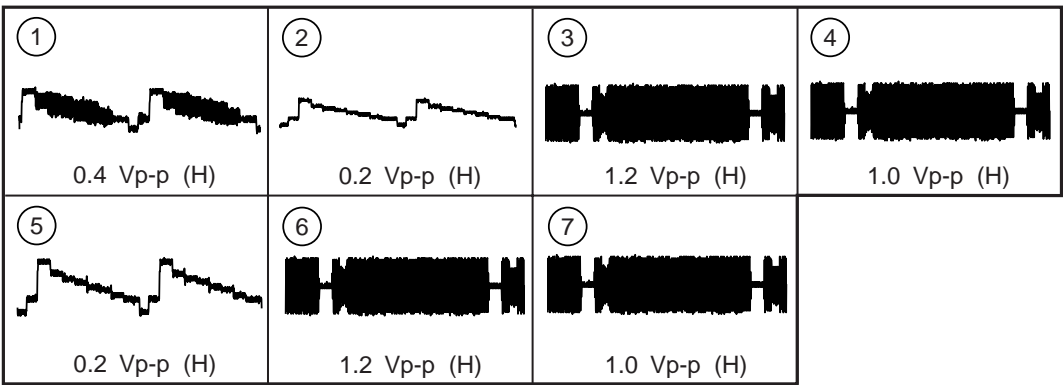
Waveforms A Board



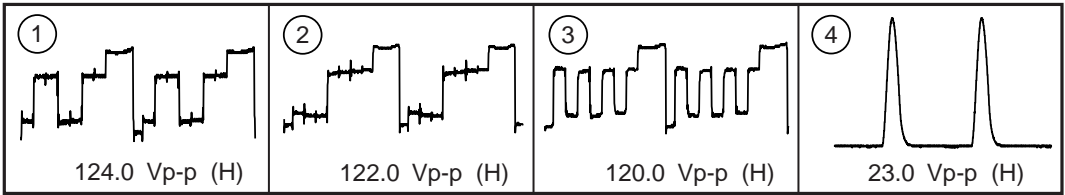
Waveforms D Board



Waveforms J1(1/2) Board

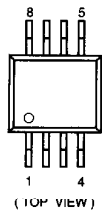


Waveforms C Board

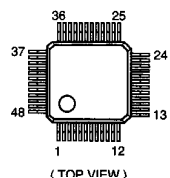


5-4 SEMICONDUCTORS

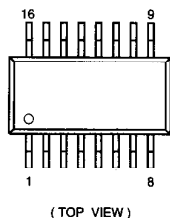
BA7046F
BA7046F-T1
LM393PS-E20
MB3793-42NF
MB3793-42NF-ER
NJM2240M
NJM2240M(TE2)
NJM3404AD



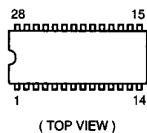
CXA1855Q-T6



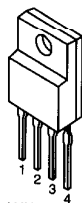
CXA1875AM-T4
HE4094BT
MC14052BDR2
MC74F157ADR2
SN74LS221D
74HCT4046AD/S470



CXD2053S
TDA4780/V3

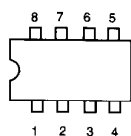


KA78R05TU
KA78R09TU
KA78R33TU

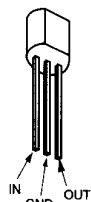


1 : VIN
2 : V OUT
3 : GND
4 : ON/OFF CONTROL

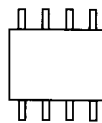
LM393D
M5216P
M24C32-BN6
ST24C16FB6
TDA2822M
UPC393C



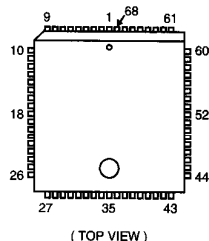
LM78L05ACZ
LM70L12ACZ
L78L05ACZ-AP
L78L12ACZ-AP



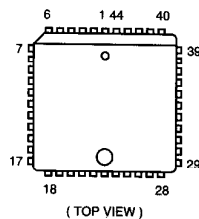
MB3793-42PNF-ER



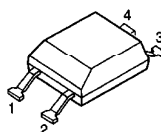
MSP3410D-QA-B4
SAA7185WP
SDA5273P-C134-GEQ
SDA5275



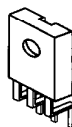
M27C800-100K1



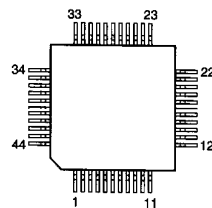
PC123F2
PC123FY2



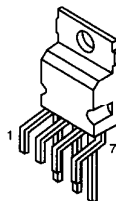
SBX1981-51



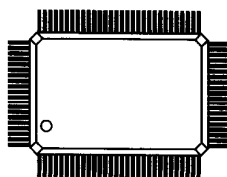
SDA9361



STV9379



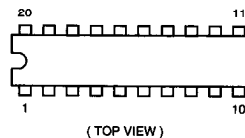
SAB-C161R1-LM



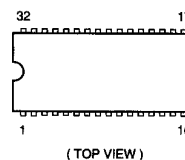
TC55257DFTL-70V-EL



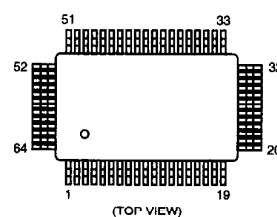
TDA7309D013TR



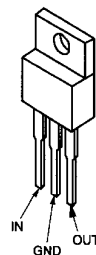
SDA9288X-B121
TDA9143/N2
TDA9144/N2
TDA9170T



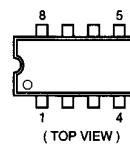
TDA9320H-N1-518



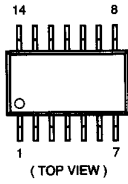
TEA6422DT
LM393N



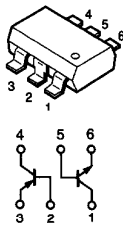
TOP209P



U2860B-BFPG3
74LVC08D



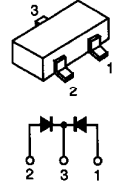
IMZ1A-T109



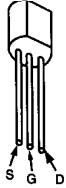
2SC2500-B
2SC2551-O
2SC2551O-TPE2



DAN202K
DAN202K-T-146



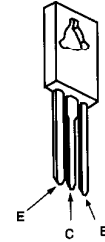
BC546B
BC556B



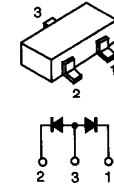
IRF614
IRF620



2SC2688-LK
2SC3840K



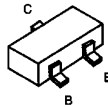
DAP202K
DAP202K-T-146



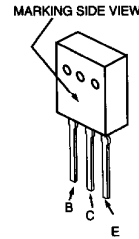
BF199
BF199-AMMO



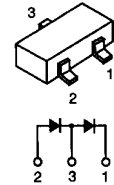
DTA144EK
DTA144EK-T146
DTC114EK
DTC114YKA-T146
DTC123EK
DTC123EK-T146
DTC124EKA-T146
DTC144EK
DTC144EK-T146
2SA1037K-T146-R
2SA1162-G
2SC2412K-QR
2SC2412K-T146-R



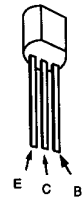
2SC3997CA



DA204K
DA204K-T-146



BF421-AMMO



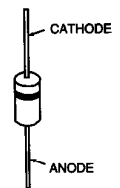
DTA144ESA
DTA144ESA-TP
DTC114ESA-TP
DTC144ESA-TP
2SA1175-HFE
2SA733-K
2SA933AS-RT
2SA933AS-QRT
2SA933S-RT
2SC1740S-RT
2SC2785-HFE



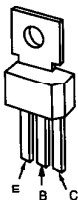
2SC4793



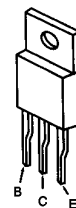
D1NL20-TA
D1NL20U-TR
D1N54-TR
EGP20G
EL1Z
GP08D
GP08DPKG23
R2K-V1
RGP02-20EG23
RGP10GPKG23
RGP15GPKG23
S2LA20F
1SS133T-77
1SS83
1SS83TD



BF87-127



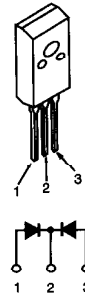
2SA1837



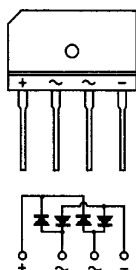
2SD2396H



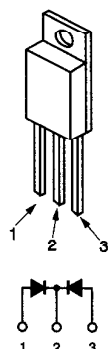
D10SC4M
D10SC6M



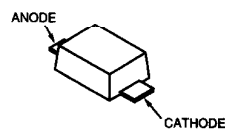
D4SB60L
D4SB60L-F
RBA-402L



ESAC39M-06C
ESAC39M-06CF38



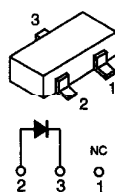
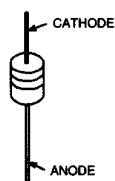
UF4005PKG23



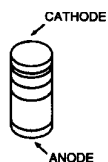
ERA38-06TP1
ERA82-004TP1
GP08DPKG23
MTZJ-T-77-12
MTZJ-T-77-15
MTZJ-T-77-2.2B
MTZJ-T-77-22
MTZJ-T-77-33C
MTZJ-T-77-3.6B
MTZJ-T-77-4.7B

MTZJ-T-77-5.6B
MTZJ-T-77-6.8
MTZJ-T-77-7.5B
MTZJ-T-77-9.1
MTZJ-33C
RD5.6ESB2
RD9.1ESB2
PGKE200AG23
1SS119-25
1SS119-25TD

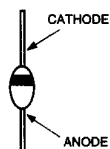
MA3033-L
MA3033L-TX
MA3056M-TX
MA3062M-TX
MA3030-H-(TX)



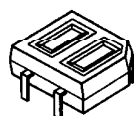
MA3051L-TX



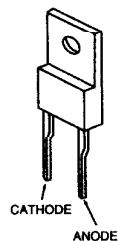
ERC04-06SE



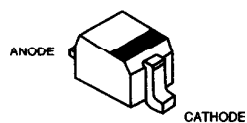
MA73-TX



ERD08M-15

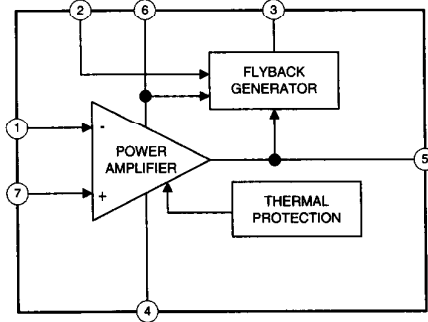


RD12SB2
UDZ-TE-17-6.2B
UDZ-TE-17-6.8B
UDZ-TE-12B

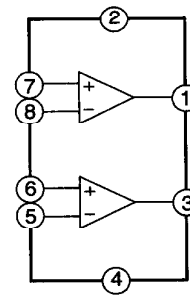


5-5. IC BLOCK DIAGRAMS

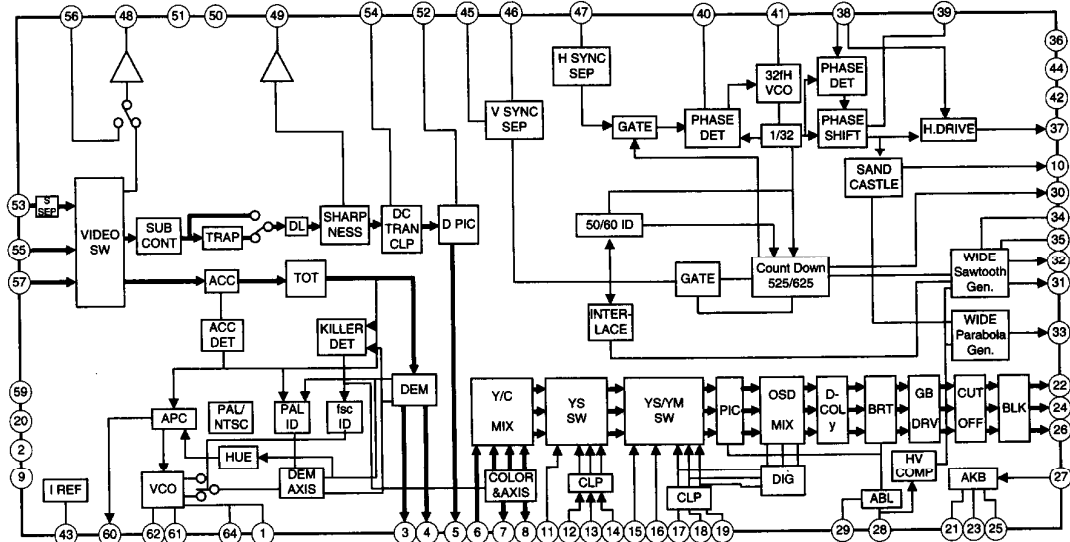
D BOARD IC6700 STV 9379



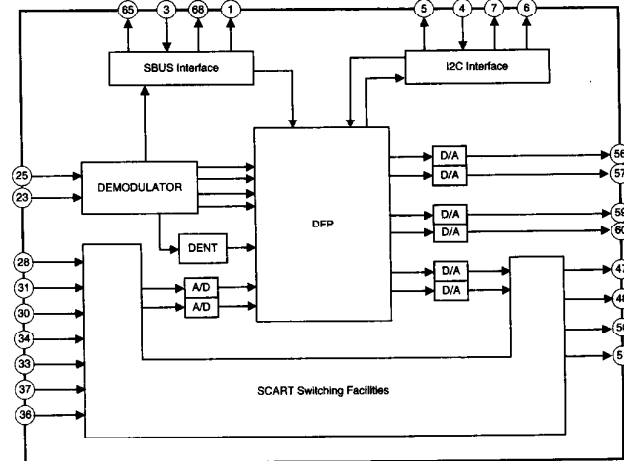
J BOARD IC8101 TDA2822D



E BOARD IC4301 CXA2100Q-TL



J BOARD IC8200 MSP3410D-QA-B4



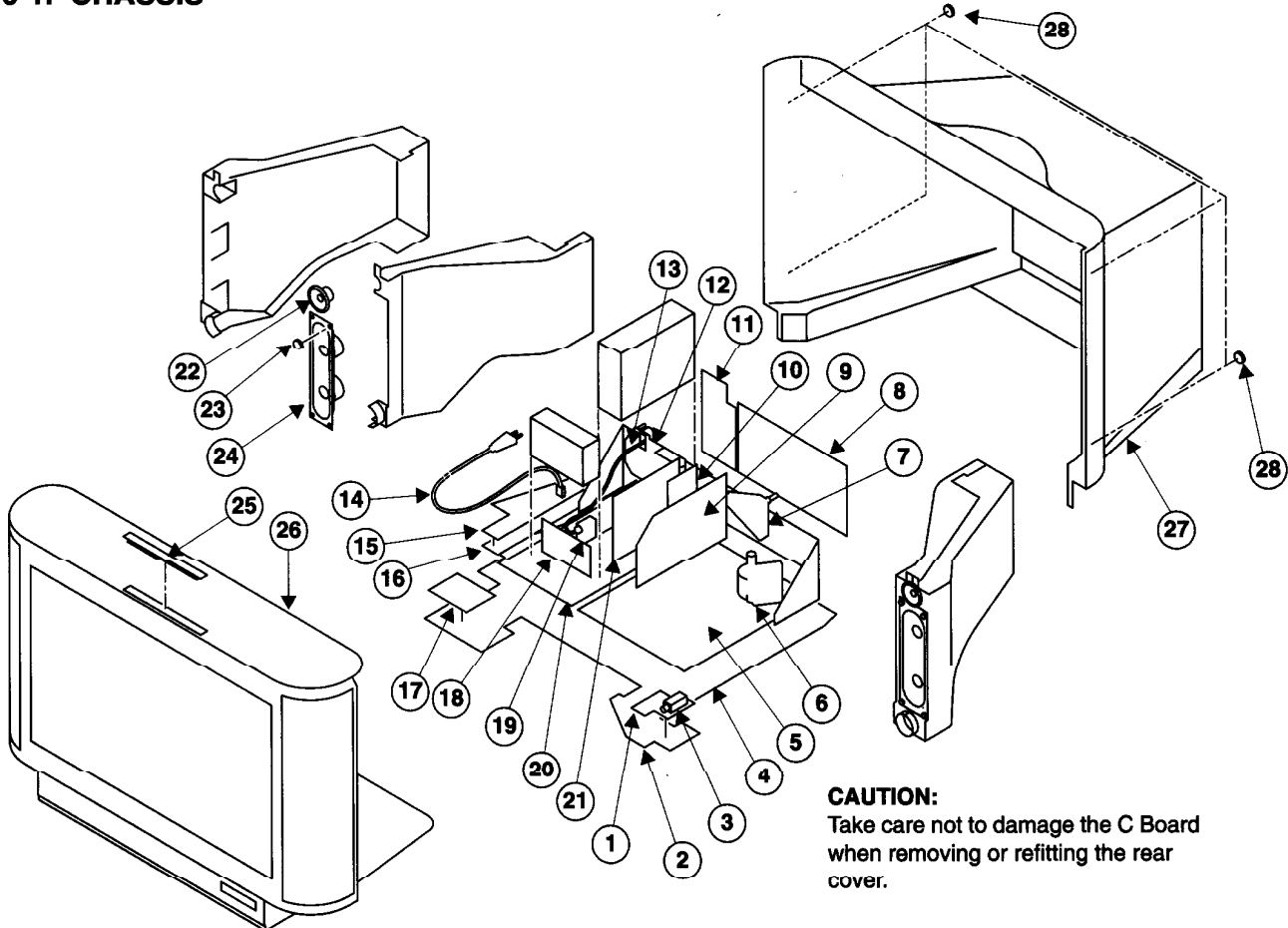
SECTION 6 EXPLODED VIEWS

NOTE :

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remarks column.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

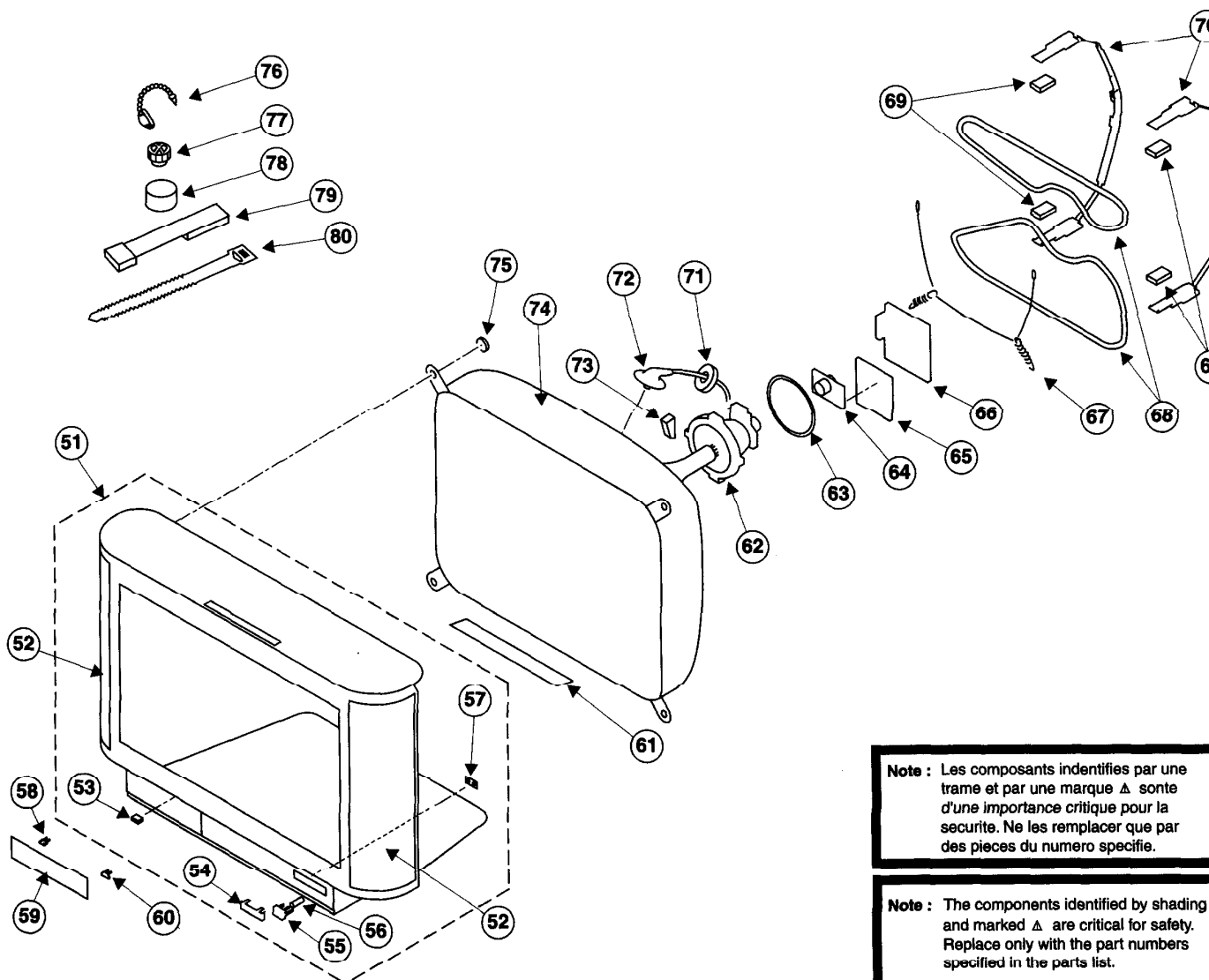
The components identified by shading and marked **Δ** are critical for safety. Replace only with the part number specified.

6-1. CHASSIS



REF. NO.	PART.NO	DESCRIPTION	REMARK	REF. NO.	PART.NO	DESCRIPTION	REMARK
1	*A-1624-073-A	F BOARD, COMPLETE		18	*A-1634-046-A	M BOARD, COMPLETE	
2	4-204-408-01	BRACKET, H, F		19	1-693-338-11	TUNER/VIF (AEP)	
						(KV-29FC60A/29FC60D/29FC60E/ KV-29FC60K/29FC60R)	
4	1-204-549-01	BRACKET, MAIN			1-693-340-11	TUNER/VIF (FR) (KV-29FC60B)	
5	*A-1640-318-A	D BOARD (29"), COMPLETE		20	*A-1630-990-A	A BOARD, COMPLETE	
						(KV-29FC60A/29FC60D/29FC60E/ KV-29FC60K/29FC60R)	
7	4-204-476-01	BRACKET, J1			*A-1630-991-A	A BOARD, COMPLETE (KV-29FC60B)	
8	*A-1651-098-A	J BOARD, COMPLETE		21	*A-1620-111-A	B2 BOARD, COMPLETE	
9	*A-1640-320-A	D1 BOARD, COMPLETE		22	1-529-155-11	SPEAKER (4.2X2.7CM)	
10	*A-1640-319-A	E BOARD, COMPLETE		23	4-039-355-11	SCREW (4X12), (+) BV TAPPING	
11	*A-1648-020-A	U BOARD, COMPLETE		24	1-529-154-11	SPEAKER (5.7X2.4CM)	
12	4-204-477-01	BRACKET, J2		25	1-771-599-11	SWITCH, ARRAY	
13	1-790-082-11	CABLE, RF		26	4-204-399-01	PLATE, TOP	
				27	4-204-404-01	COVER, REAR	
15	*A-1624-074-A	F1 BOARD, COMPLETE		28	4-039-558-01	SCREW (4x16), (+) BV TAPPING	
16	4-204-552-01	BRACKET, F1					
17	*A-1646-170-A	H1 BOARD, COMPLETE					

6-2. PICTURE TUBE



REF. NO.	PART. NO	DESCRIPTION	REMARK
51	X-4200-418-1	BEZNET ASSY	53-57
52	X-4200-419-1	GRILLE ASSY, SPEAKER	
53	4-042-192-01	CATCHER, PUSH	
54	4-204-396-01	WINDOW	
55	4-204-395-01	BUTTON, POWER	
56	4-202-964-11	SPRING	
57	4-204-397-01	GUIDE, LIGHT	
58	4-202-555-01	SHAFT, DOOR	
59	4-204-398-11	DOOR (KV-29FC60A/29FC60B/29FC60E/29FC60K)	
	4-204-398-01	DOOR (KV-29FC60D/29FC60R)	
60	4-045-250-01	DAMPER	
61	4-203-128-31	SHEET, BLOTTING	
63	1-452-896-11	COIL, NA ROTATION (RT200)	
65	*A-1644-094-A	VM BOARD, COMPLETE	

REF. NO.	PART. NO	DESCRIPTION	REMARK
66	*A-1638-123-A	C BOARD, COMPLETE	
67	4-200-433-01	SPRING, EXTENSION	
69	4-203-390-01	CUSHION, DGC	
70	4-060-820-01	HOLDER, DGC	
71	4-203-022-01	HOLDER, HV	
73	3-704-495-01	SPACER, DY	
75	4-204-255-01	PT - SCREW	
76	4-308-870-00	CLIP, LEAD WIRE	
77	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM	
78	4-425-032-00	MAGNET, DISK; 10MM	
79	X-4387-214-1	PERMALLOY ASSY, CORRECTION	
80	3-701-007-00	BAND, BINDING	